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to the Hon. Secy of the Interior

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Dear Sir

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To

Doctor Saunders
with respectful Comp^{ts}
from the
Translator

XVI 3

A

T R E A T I S E

ON THE

E X T R A C T I O N

OF THE

C A T A R A C T.

BY

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STOCKHOLM, AND COPENHAGEN, &c.

TRANSLATED FROM THE GERMAN.

WITH A PLATE; AND

N O T E S

BY THE

T R A N S L A T O R.

L O N D O N :

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T H E

T R A N S L A T O R ' S

P R E F A C E.

TH E charms of novelty often exert their influence as powerfully over our reason, and the higher faculties of the mind, as over the external senses; hence, not only in matters of mere taste, but also in the doctrines of science, and in the practice of the arts, new modes of thinking and acting have become celebrated, and fashionable, more perhaps from a principle of variety and change obtaining in human nature, than from their superior advantages over those methods that preceded them.

About half a century ago, Monsr. Daviel, a celebrated French surgeon, first published

to the world a method for extracting the Cataract: I say, first *published*, for it is doubted by many, whether he had the honour of the invention. The idea was new, and, being plausible, soon attracted attention: and, as it is natural to suppose that its advocates, from having paid extraordinary attention to it, had acquired considerable dexterity in performing the operative part—and as they found their interests intimately connected with its reputation, we are not to wonder that they busily employed themselves in extolling its superior success and advantages over that of Couching. Yet, were any candid person to take the trouble of comparing the operation for Extraction, as proposed by Mr. Daviel, with the operation of Couching, as then performed, he will not hesitate in pronouncing in favour of the latter.

Since that period, however, this new mode of operating has undergone very great improvements, both in regard to the principles by which all its parts are regulated, and also in respect to the instruments used, insomuch that it is now as much to be depended on as any other in surgery.

Hitherto

Hitherto this operation has in England, as in Germany, been chiefly confined to the hands of Itinerants ; who, to do most of them justice, certainly acquire a dexterity which is but seldom to be met with among regular-bred surgeons. It would be idle here, in attempting to prove that this dexterity is the result of practice alone, and may be acquired by most men, who will give themselves the trouble of exercising themselves on the dead subject: and, as the operation is fully as valuable as any other in the art of surgery, it ought to be an object of serious attention to the scientific part of the profession.

It was chiefly with a view to engage the regular-bred surgeons in Germany to the practice of this operation, that the author was induced to publish this treatise. But, as he has sufficiently explained his motives in his Preface, it is unnecessary to insist further upon them, than to add, that when applied to Great Britain, they will be found sufficient to justify a translation of his work.

Experience must always be dear to men, whose profession is founded on well-established facts and observation: but when, to

great experience, an author adds extensive erudition, his writings become highly valuable indeed. This character may be given to all professor Richter's surgical works. Through the whole of them are collected the best precepts of the best authors who have preceded him, joined to his own ideas, the result of extensive practice: combining, in this manner, the qualities of an useful compiler, with those of an original writer.

The following translation has little to boast of, except as being the medium of communicating what it is hoped will prove useful: it has otherways great claims to indulgence, being the first attempt of the Translator in this line.

Through the whole of the following treatise it will be found, that the Author speaks of the anterior and posterior chamber of the aqueous humour; and it has been thus constantly translated, without any allusion to the assertion of Mr. O'Halloran*; who says, that that part of the iris which is not connected

* See his paper in the Transactions of the Royal Irish Academy, 1788, p. 121.

with the vitreous humour, lies in immediate contact with the capsule of the lens, and that therefore “*the idea of a posterior chamber of the aqueous humour must be for ever banished.*” To me, the grounds on which Mr. O’Halloran founds his assertion, appear extremely inconclusive, and are such as will not justify the absolute denial of the existence of a posterior chamber of the aqueous humour; nor do I indeed see how any positive proof can possibly be adduced, which will ascertain the degree of proximity between the iris and capsule. If these two parts were in immediate contact with each other, as that gentleman assures us they are, we should find considerable difficulty in accounting for the rapid motions of the iris, considering the delicacy of its texture, and the degree of friction it must sustain. The arguments, however, which Mr. O’Halloran adduces in support of his opinion, are ingenious, and sufficient to awaken doubts concerning the prevailing idea of the situation of the iris; and it were to be wished, that he had confined himself to that point alone; for the rest

of his paper does its author but little credit, either as an anatomist, or judicious surgeon. His opinion concerning the structure of the capsule of the lens, which evinces the carelessness with which he has made his anatomical researches, is proved to be completely erroneous by the experiments and arguments of Janin, and by the facts related by the Author of the following treatise, in his chapter on the membranous Cataract. Mr. O.'s assertion, concerning the impossibility of any part of the vitreous humour being regenerated; and that a diseased lens, whether hard or soft, is always smaller than a sound one; show how little he is acquainted with the physiology and pathology of the organ, concerning the nature of which he pretends to instruct us.

With regard to the method which Mr. O'Halloran recommends for extracting the cataract, and the knife which he employs, nothing more dangerous and injudicious could possibly have been devised. And for a comment upon them, he is referred to what professor Richter says upon the subject

ject of cutting the cornea, and the form of the instruments to be employed for that purpose.

London,
November, 1790.

T H E
A U T H O R ' S
P R E F A C E.

I HAVE taken the contents of my first collection of *Surgical Observations* *, as the groundwork of the present treatise; but they will be found so much improved, altered, and augmented, that no one can look upon this as a mere translation of those observations. My view was partly to make known the result of my later experience, and partly to communicate to Surgeons in Germany a faithful account of one of the most important operations in Surgery. It must not be looked upon, however, as a complete compilation of all that can, or has been said on the Cata-

* *Observationum Chirurgicarum*, fasc. 1.

ra^ct: for it only contains a short relation of what I have observed myself in performing this operation: which, however, I hope will be sufficient to enable any Surgeon to execute the same.

There are many propositions which, in my first collection of *Observations*, I looked upon as true and well-founded, entirely altered in this treatise, and declared to be ill-founded. We learn more and more every day, and experience proves to us that we have often erred where we thought ourselves most secure against error. It may therefore happen, that, at a future period, I may tell my readers that even in this treatise some faults exist, notwithstanding all my endeavours at this moment to be exact.

In other respects, my views will be completely fulfilled, if this treatise should encourage the German Surgeons to undertake an operation which at present seems to be almost entirely banished from the regular practitioner, and confined to itinerant oculists.

It will sometimes happen that a patient loses his sight some months or years after the operation. Ignorance, and frequently envy

and ill-will, ascribe this accident to the fault of the surgeon. It is needless for me to prove the injustice of such a charge. But it may be asked, Is not this second blindness a reflection on the operation itself? I have heard it often asserted, that the operation for the Cataract is at all times but a palliative, and that the blindness which it relieves generally returns.

Admitting this objection to be founded, it only proves that the practice of Surgery resembles that of Physic. The objection, however, is in general not well founded. Any one, who has the inclination, may convince himself of the contrary by many living examples. Most of those upon whom I have performed the operation still enjoy their sight. Some, it is true, have again lost it, partly by their own faults, partly from other causes. In the following treatise I have related their cases, and pointed out the causes where this second blindness is chiefly to be dreaded. I have also suggested some means by which I think it may be avoided.

Let us suppose, however, that a person loses his sight from two to ten years after the operation. Has he in the mean time gained
nothing

nothing by the operation? Will a Physician acknowledge that he has performed but little service to a patient whom he relieves from a pleurisy, or dropsy, because that patient shall happen to die some time afterwards of the same complaint? If some patients lose their sight a second time after the operation, is the complaint for that reason incurable? It will generally be found that it is owing to an opacity of the capsule; and this capsule has been often enough taken out and the sight restored.

The Surgeon who performs this operation ought to be able both to prevent and remedy the evils that are occasionally the consequences of it; such knowledge being equally essential with the art of operating. I have in one chapter laid down some rules for treating properly those symptoms which commonly supervene after the operation.

If this treatise is favourably received, I may probably, at a future period, be tempted to treat of the fistula lachrymalis, a disease concerning which I have had much experience.

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EXPLANATION

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A TREA-

A

T R E A T I S E

O N T H E

EXTRACTION OF THE CATARACT.

C H A P. I.

On the different Kinds of CATARACT.

TH E cataract appears sometimes to be entirely a local or topical disease; at other times, however, it seems as if it were the consequence either of a general disease of the habit, or of that of some other part. It is to be considered as a local complaint, when it arises in consequence of any blow, wound, or inflammation of the eye; or, in a word, when it originates from a local cause in a person who is otherwise in good health. We now and then observe it, however, in gouty, scrophulous, scorbutic, and venereal habits, and in such cases we have some reason to suspect that

B

it

it is not altogether topical, but that it is more or less connected with the general disease of the constitution. This observation is of great consequence; for I have observed, and that not seldom, that where the operation has been performed in such cases, a total blindness has followed sooner or later. A man who had been much troubled with the gout, and a lady of a scorbutic habit, had both of them their sight restored by means of the operation for the cataract. Seven months after, the pupils of their eyes gradually contracted themselves, and at last closing altogether, a second blindness ensued.

I do not mean to assert, that in such cases the operation ought to be entirely forbidden. All that I remark is, that the success is less certain; that the patient will require a very careful preparation for the operation, and much attention after it.

There are some surgeons who believe that, at all times, the operation for the cataract is only a palliative remedy, and that the patients lose their sight again sooner or later after it. This, perhaps, may be asserted, and with some degree of truth, of such cataracts as seem connected with a general disease of the habit; but
most

most undoubtedly of none of such as are altogether local. This is confirmed by experience.

Along with those cataracts which are to be regarded as the effects of a constitutional disease, may, perhaps, be very properly classed what has been denominated the *hereditary cataract*; for in fact there seems to be such a one. I have extracted the cataract from a man whose father, and grandfather were both blind from that complaint, and whose son has already an incipient one. Maitre Jean ^a and Janin ^b have both seen similar cases. I myself have seen three children, all born of the same parents, and who all acquired cataracts at the age of three years.

The cataract is in general slow both in its origin and progress. One case, however, I have seen, where it was completely formed in the course of one night. A forester, who had been labouring under the gout, had his feet exposed to a great degree of cold during the night: the gout suddenly retroceded in consequence, and he was entirely deprived of his

^a See his *Traité sur les Maladies des Yeux*, p. 176.

^b See his *Observations sur l'Œil*, p. 149; where he assures us, that a whole family of six persons were blind from this disease.

fight the same night. I saw him next morning, and found a complete pearly coloured cataract. Eschenbach relates a similar case^c.

The seat of the disease is various; and in this respect we may enumerate five different kinds. It is either the crystalline lens alone, or the lens, the capsule, and the liquor Morgagni together; or it is the anterior part of the capsule; or its posterior part; or the liquor Morgagni singly.

The first is the most frequent and best kind, the second the worst, and the fourth the most uncommon. I have seen the last only once.

No sooner had I punctured the capsule, by means of *La Faye's* instrument, than two or three drops of a whitish fluid flowed out, and the same moment the pupil became clear, and the patient saw. Three months afterwards, a cataract took place in the same eye, which in all probability was seated in the body of the lens itself. On this account, I think a surgeon would act prudently, in all similar cases, were he always to extract the lens, although it should not be opaque at the time of operation; for it is always to be dreaded, that it

^c See his *Observ.* p. 43.

may become so in consequence of the injury done to the capsule, and to the lens itself during the operation.

There is a considerable variety in the consistence of the opaque lens; and in this respect we again enumerate five different kinds. Sometimes it is as soft as a jelly; and this cataract, which it is impossible to remove by couching, is however of very easy extraction. As soon as the anterior part of the capsule is pierced, by means of *La Faye's* instrument, a part of this soft cataract immediately protrudes itself through the opening, without dilating the pupil in the smallest degree; and the operation is not only easy, but in general is followed by no bad consequences whatever. Sometimes the lens shall be entirely converted into a milky coloured liquor, which, in all probability, is the *cataracta purulenta* of old writers. In this kind of cataract, the operation does not always succeed in the same way. When the *membrana capsularis* is thin and delicate, it is easily pierced by means of *La Faye's* cystitome, and then the milky contents flow out without the smallest injury being done to the iris. At other times, however, the capsule is uncommonly hard and

tough. If pressure be employed here, the whole capsule forces itself through the pupil, in the form of a bag containing a whitish fluid. I call this kind the encysted cataract (*cataracta cystica*). I have only extracted such a cataract once. After making my incision through the lucid cornea, I pressed pretty hard on the eye, without being able, however, to make the cataract move; upon which I encreased the pressure considerably, when at once the whole capsule started suddenly forward, and after it a part of the vitreous humor. It was very large, quite round, and milk white. The extraction of such a cataract as this requires a good degree of pressure on the eye, and is accompanied with a forcible dilatation of the iris, and the danger of losing a part of the vitreous humour. Indeed, I know of one case, where great pressure was tried in vain, and the surgeon was obliged at last to introduce a pair of small forceps in order to extract the cataract. All these inconveniences may be avoided, as soon as we discover the real nature of the disease. We ought then to open the capsule by means of *La Faye's* instrument, even although some force should be requisite towards the effecting it;

it; and as soon as the milky liquor has flowed out, the operator must lay hold of the capsule with the small forceps, and pull it out also.

At first I imagined that the sack consisted of the external lamella of the lens, and that its internal substance had been converted into the whitish fluid; but I am now convinced, that it is the capsule itself which forms the sack, and that in many cases this comes easily away, together with the lens, during the operation. I have several lenses in my possession, which I have myself extracted, and which evidently show this. They are inveloped in a membranous sack, which is evidently the capsule. Those, from whom I extracted these cataracts suffered no uncommon or bad consequences from the operation, but all recovered their sight perfectly; from which it may be concluded, that the eye does not suffer from the loss of this part; which is a circumstance of importance to know.

It happens now and then, that as soon as the capsule is opened, a considerable quantity of a milky-coloured fluid flows out, and soon after follows a very small lens. The quantity of the fluid, and the uncommon

smallness of the lens, render it probable that its external lamellæ have been dissolved. Sometimes the lens has the consistence of new cheese; and this kind of cataract is fully as difficult to depress as to extract. In general it is very bulky, and, when passing through the pupil, it either forcibly distends the iris, or breaks, leaving fragments remaining in the capsule. These portions must all be taken out; in the effecting of which the eye generally suffers much.

The most frequent and best kind of cataract is that which has been denominated the horny cataract. The lens is sometimes as hard as a stone or piece of bone. This, however, is a rare occurrence, which I have never met with; but St. Yves^d, Heister^e, Ronnow^f, and others, have seen it.

Janin believes that it takes place, principally in old people, and, in general, in consequence of some external violence done to the eye.

^d Vid. *Maladies des Yeux*, p. m. 151.

^e See his *Observations*, vol. 2.

^f See his *Tal om en ben-eller stenaktig Starr, vid hela omkretsen of Unea fast vuxen, som lyckligen blifvit med nalen nedtryckt*; Hallet *Får kongl. Vetenskaps Akademien*, vid *Præsidii Nedläggande*, den 20 April, 1768.

The cataract is said to be ripe when it is of a pearl colour, and when the patient is so totally bereft of sight that he can only distinguish light and darkness. If, on the contrary, the cataract be only of a milky colour, and that the patient can not only distinguish objects, but also some colours, it is then said to be unripe and soft. There are, indeed, some who actually believe that the lens becomes soft at the onset of the disease, and that it again grows gradually harder as the opacity encreases. Hence they conclude that an incipient cataract is always soft, and a confirmed one hard; an opinion which is contradicted by experience.

In a word, this gradual change of the crystalline lens is quite imaginary, the appellations ripe and unripe are ill founded, and all that has been said concerning these two states subject to much doubt. I have extracted cataracts of ten, twelve, and fifteen years standing, which were so soft that their figure was altered as they passed through the pupil; and again, I have seen others of one or two years which have been perfectly hard. The consistence of the cataract does not depend on its age. I would almost believe that some lenses actually
turn

turn soft as soon as they begin to grow opaque ; and that hence there arises a cataract originally soft, which remains so ever after. In the same manner it seems as if there were other crystalline lenses which begin to acquire an uncommon hardness as soon as they begin to change colour ; and that hence arises an original hard cataract, which remains so ever afterwards. This change in the crystalline lens is probably owing to the peculiar nature and effect of the cause producing the disease.

There is hardly any characteristic mark of a soft or hard cataract that is to be depended on. The colour proves nothing. I have extracted some of a milky colour, which were quite hard ; and again, I have seen others of a pearly colour, quite soft. Neither is any thing to be concluded from the degree of opacity ; for I have observed in those who were so deprived of sight as to be able only to distinguish light and shade, that the crystalline lens was quite soft, and, on the contrary, that those who could still distinguish objects and colours had their lens quite hard.

There are, however, two symptoms that I shall just now communicate to my readers,
which,

which, although I cannot say they have never, yet have very seldom, deceived me. The softer the lens is, the larger and thicker it is in general, and therefore approaches nearer to the edge of the pupil; hence I always conclude that the cataract is large when it is near the pupil; and in this I have found myself but seldom deceived.

In order, however, to judge of the space between the pupil and the lens, the surgeon must look into the person's eye from one side; but in general it requires much experience and exercise in order to judge of this with accuracy: besides, there are cases where no such symptom ever can appear, as in those where the iris adheres to the cataract; and in some other cases it can be of no use, such as in an atrophy or dropsey of the eye.

Further, we are sometimes able to discern on the cataract, points, streaks, or other marks. If, after having attentively observed the place, figure, and disposition of these, we find that in some days afterwards, or upon rubbing the eye pretty hard, they have undergone any change in their figure or situation, we may then conclude with certainty that the cataract is soft; only we must be cautious

not

not to draw an opposite conclusion; I mean, that we are not to conceive the cataract to be hard if these should happen to suffer no change.

The uncertainty of the marks by which we might distinguish a hard from a soft cataract, and the excessive difficulty there is in attempting to depress a soft lens, gives the operation of extraction a decided advantage over that of couching. It is full as easy to extract a soft as a hard cataract, and the extraction on this account succeeds in general much better than couching; for, upon introducing the couching needle into the eye, on the supposition that the cataract is hard, and afterwards discovering, contrary to conjecture, that it is soft, difficulties occur which we sometimes find impossible to overcome; and on the other hand, deceived by the incertitude of the symptoms, the operation is often neglected from an idea that the cataract is soft, whereas, had it been performed, it might have turned out very successful. They suppose that those marks which seem to them to indicate the unripeness of the cataract will gradually wear away, and that in time it will become ripe; whereas the cataract remains, both as to appearance,

ance, and in reality, just the same, and the patient is thus neglected during the whole of his life. I myself have extracted the cataract from a woman, whom some refused to couch, merely from the idea that the lens was soft. It was hard, however, and might have been easily couched.

All these difficulties can be overcome by extraction. I do not assert, indeed, that all kinds of cataract are equally easy of extraction. The best kind is that which is hard; for it is in general small, passes easily through the pupil, and leaves no part behind. Next to it is that which is like a jelly in consistence; for this also passes through the pupil without doing any injury, although it is apt to leave some part remaining in the capsule. The worst kind is the cheesy cataract, which either breaks, and must be extracted piece by piece, or, if it remains whole, dilates the iris so forcibly in its passing out, and requires such a pressure on the eye, as generally forces out some of the vitreous humour after it.

It is remarkable, that the colour of the cataract is found to be different after extraction,
from

from what it appeared to be previous to the operation.

I have seen cataracts, which previous to the operation appeared of a pearl colour quite yellow after they were extracted, and on the other hand, some that appeared yellow to be of a pearl colour. The encysted cataract, which I formerly mentioned, was of a milk-white colour, although in the eye it appeared of a pearl colour. Most lentes which I have extracted are much harder and more opaque in the center than at the surface; nay, lentes have been seen, whose center was as hard as stone. Ought we not then to conclude from hence that the disease always begins in the center? And yet, when we look at the eye of a person who has an incipient cataract, we observe, that the opacity is pretty much the same over the whole surface of the lens.

I have once seen the tremulous cataract, *cataracte branlante*; it was quite white, and had dark-coloured stripes here and there on its surface. Its distance from the pupil was very small, the motion of the iris was free, and the patient could discern light from shade. Upon
the

the smallest motion of the eye or the body, not only the cataract but the whole iris trembled. Maitre Jean is mistaken when he thinks that this kind of cataract is always conjoined with the inability of distinguishing light from darkness.

I have also once seen what has been denominated the *cataracte barrée*. Across the center of the cataract there run a milk-white stripe, which seemed to lie anterior of the lens. I judged from the appearance, that this stripe had its seat in the anterior portion of the *membrana capsularis*; nor was I deceived. I shall have occasion to take notice of this kind of cataract by and bye.

It is no uncommon case for the 'amaurosis, or gutta serena, to be associated with the cataract. If the patient complains of frequent head-ach, and feels an uneasy and dull pain in the orbit, or around it, or at the root of the nose, and at the same time imagines he sees red sparks and clouds flying before his eyes, we have great reason to be afraid that there is an incipient amaurosis, and in this case the happy effects of the operation for the cataract is in general but of very short duration.

Should the patient have a confirmed gutta

ferena, it would be folly to attempt the operation. Unfortunately, however, we are not always able to discover it when present. The immobility of the iris has been considered as a characteristic mark of it. But that may also originate from the adhering of the iris to the membrana capsularis. Besides, there are many cases of perfect amaurosis, where the pupil has remained moveable. The inability also of distinguishing light from shade is a most uncertain mark of this disease; for that may also be owing to an adhesion between the iris and capsule. In such a case, therefore, where we wish to judge with tolerable certainty, particular attention must be paid to the distance of the cataract from the pupil. If the distance be very small there is reason to suppose an adhesion has taken place. Should the distance be considerable, an amaurosis is probably the cause.

It has been advised by some not to attempt the operation whilst the cataract is confined to one eye only; partly, because the operation, it is said, is unnecessary as long as the patient enjoys the perfect use of the sound eye; partly, because, from the difference of the focus of vision in the sound eye, from that of
the

the eye which had been operated on, great confusion it is thought would arise in the sight. Whether this last circumstance be true or not I shall not take it upon me to determine; but I am convinced, for many reasons, that the advice is to be disregarded. It is a fact, that when one eye becomes diseased, the other generally does so also, sooner or later. Those who have a cataract in one eye, are generally very soon affected with it in the other also; and this, as I have already said, holds good, not only with regard to the cataract, but also with other diseases of the eye.

It has actually happened to me, in the course of practice, that the loss of one eye has been the cause of the loss of the other also; and that a disease in one has brought on a disease in the other. I knew a forester who had received a small shot in the orbit of his right eye; an amaurosis was the consequence, and in about three quarters of a year after he was attacked with a cataract in the left, which, till then, had never received any injury. More instances of this kind it would be useless to relate.

I am, however, perfectly convinced in my own mind, that there is a great consent or

sympathy between both eyes, and that those who have a cataract in one have great reason to dread the loss of the other also. And hence, therefore, arises the question, Is it not possible to save the loss of the sound eye by a timely operation? I confess myself much inclined to believe that this may at least happen now and then. I once performed the operation on a woman who had a complete pearl-coloured cataract in the left eye, and an incipient one in the right, which, before the operation took place, was beginning to advance rapidly. After operating on the left eye, the progress in the disease of the right seemed to be checked, and at present, which is five years since the operation, it is exactly the same as the day on which it was performed. St. Ives^s relates a very remarkable case, which ought to be taken notice of here: A man was wounded in the right eye with a small shot, and shortly after that eye was affected with a cataract. Some time afterwards the same disease took place in the left eye, but which gradually disappeared after the cataract had been extracted from the right.

All this, in my opinion, demonstrates the necessity of performing the operation as early as possible, and that by doing so we shall be able to prevent the probable loss of the other; and here again we have an opportunity of seeing the superiority of the new over the old method of operating. Those who couch must wait till it be hard; and they often wait in vain. The cataract remains just as it was, and in the mean time the other eye becomes diseased.

There is still another good reason for rejecting the above-mentioned advice. When the state of the cataract and the health of the patient are both perfectly good, the operation ought not to be delayed; for, under such circumstances, every thing promises an happy issue. But should the operation be delayed, the cataract may happen to alter for the worse, the general health of the patient may become impaired, and thus the precious moment, in which the best success might have been secured, is lost, perhaps to return no more.

C H A P. II.

*On the Means employed for securing the Eye
during the Operation.*

IT has always been imagined, that an operation of so exquisitely delicate a nature as that for the extraction of the cataract, was hardly to be executed with every requisite nicety on a part so moveable as the eye ; and on this account a number of means and instruments have been invented in order to keep that organ steady. I take it upon me, however, to assert that every one of these inventions are not only unnecessary, but even hurtful.

I confess it to be true, that the fear and anxiety the patient experiences shortly before the operation, often induce the most violent convulsive motions of the eye, which it is impossible for him to restrain, however great his exertions may be to do so ; nay, all strong admonitions and entreaties only serve to increase his own restlessness, and that of the eye. But the surgeon has nothing to dread
from

from these motions however violent they may be ; for, when he has placed his hand on the cheek of the patient, and is ready to enter the knife as soon as a favourable opportunity presents, he has only to leave the patient and the eye to themselves for a few moments, and he will find that, as soon as the first impressions of fear and surprize are over, the eye will become perfectly quiet and still. Should it then be in a proper position for operating, let the knife be quickly though cautiously entered ; as soon as this is done the eye becomes in general motionless. Should it still move however, we have it always in our power to secure the eye by means of the knife. In such cases, therefore, all instruments for preventing the motion of the eye become unnecessary ; and that they are hurtful surely no one will pretend to deny. That method of operating is always to be accounted the best which does the least injury to the eye. The more simple the method, the less does the eye suffer, and the greater chance there is of success. The most of the instruments employed for securing the eye irritate and press upon it, and create so much pain to the

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patient,

patient, that they ought never to be used if the surgeon can possibly do without them.

There is, however, another kind of motion of the eye, which is occasioned by the introduction of the knife, and which I therefore call involuntary. It sometimes happens that as the knife is pushed forward from the external angle of the eye towards the nose, the whole eye is turned so much inward as to make the cornea almost entirely disappear in the internal angle; and, indeed, this is not to be wondered at if we but recollect that the cornea is sometimes so dense, and hard as to require considerable force in cutting it. When the eye is once forced into this situation, it is impossible to finish the incision properly. If, under such circumstances, the surgeon should not have any instrument beside him with which he might prevent the motion of the eye, he will do well to withdraw the knife, and allow the wound to heal, and the aqueous humour to collect again, which happens in a day or two; when he may again attempt the operation. If, in spite of the awkward situation of the eye, the surgeon should still persist in his endeavours to accomplish the operation, he

he will find that the incision cannot be done with all necessary accuracy, and that in consequence the operation generally fails: I say generally, for I do not deny that an experienced and dexterous hand may be able to perform the operation very well even under all these disadvantages.

These motions of the eye, therefore, really create much difficulty. Let us now see whether any of the means or instruments which have been thought of by different writers for fixing the eye are sufficient to obviate them.

Monsieur La Faye^h applies the middle finger of the left hand to the ball of the eye, at the internal angle, and endeavours to keep it steady by means of a gentle pressure; but this finger occupies too much place, and when the eye is small, and deep approaches too near, and, indeed, covers that part of the lucid cornea where the knife ought to come out. To this we may remark, that a gentle pressure on the naked eye only serves to irritate it, and produce more violent motions than those it was intended to prevent; and that a stronger

^h *Memoir. de l'Acad. de Chirurg. de Paris, t. vi. p. 314.*

pressure is apt to occasion too early a discharge of the aqueous humour, or endanger a prolapsus of the vitreous one.

M. Berangerⁱ, an experienced surgeon, and inventor of one of the best methods of extracting the cataract, makes use of a small tenaculum, which he fixes in the conjunctiva, at a certain distance from the inferior edge of the cornea. M. Le Cat laid hold of the conjunctiva almost at the same place with a pair of small pincers. These two instruments create much pain, violent inflammation, and now and then a protrusion of the vitreous humour, from the violence and pressure with which they act on the eye. I have seen the most dreadful inflammations, and a second blindness happen in consequence of their use; but besides, when the eye lies deep, or that the opening between the eye-lids is narrow, there is in reality too little room for the application of these instruments.

M. Poyet's^k method is truly ridiculous. He secures the eye by means of a thread; but not till the operation be ended, or at least

ⁱ Thes. cel. Sabatier de variis Cataractum extrahendi Methodis. Paris, 1759.

^k Mem. de l'Acad. de Chir. de Paris, t. v. p. 399.

when there is no further necessity of fixing the eye.

I know no instrument more simple, harmless, or better contrived for fixing the eye, than Pamart's spear¹.

This instrument has two small shoulders, which ought not to be placed farther than half a line distant from the point; by which means it cannot enter too deep into the body of the eye. Before making use of this instrument, I always twist a little lint around its shoulders, not only to moderate their pressure on the ball of the eye, but to prevent its still entering so much as it would otherwise do. I make use of it in the following manner:

When about to operate on the left eye, I take it in my left hand. As soon as I have entered the point of my knife, I push the point of the spear into the conjunctiva at the upper margin of the cornea towards the internal angle of the eye, and I now guide the knife through the anterior chamber. This instrument ought to be introduced in an inclined direction, so that the hand may rest upon the nose, and the point be directed to-

¹ See figure A. in the annexed plate.

wards the external angle of the eye; for, by giving it this direction we prevent the rolling of the eye inwards. The surgeon will do well to rest that hand which holds this instrument pretty firmly on the face of the patient; for if this rule be not observed, there is great danger of pressing the spear too violently into the eye,

As soon as the point of the knife begins to cut its way through the inner portion of the cornea, the spear ought to be withdrawn; for now the eye becomes motionless; and besides, should this not be attended to, there is danger that the continued pressure might occasion not only too early a protrusion of the lens, but also a loss of part of the vitreous humour, or at least a premature discharge of the aqueous one.

In this way Pamart's spear may be used, not only with advantage, but without any danger whatever. A little pain is, indeed, excited on the first application of the instrument; but this pain is so trifling that the patient seldom complains of it, nor does it ever create any bad consequences. It happens now and then that the point of the instrument hits upon a blood vessel, and occasions a small hæmorrhage;
a trifling

a trifling circumstance, which might have been easily avoided, but which is of no bad consequence. On the contrary, I think I have observed, that where this happens the symptoms after the operation are, in general, much milder than in common.

Mr. Rumpelt, surgeon to the court at Dresden, has sent me an instrument^m of his invention, which I prefer to Pamart's. It is a kind of thimble with a spear projecting from it, very much resembling Pamart's, only that it is shorter. It is evident to every one that he must have taken the hint from Pamart's spear. This last-mentioned instrument employs the whole of the hand; and, therefore, when it is made use of, there are no less than four hands required about the eye to be operated on; one for guiding the knife, one to raise the upper eye-lid, one for the spear, and one to draw down the under eye-lid. All these exceedingly embarrass both the patient and surgeon. Rumpelt's instrument, on the contrary, only requires one finger; for, supposing that it be the left eye which we are about to operate on, and that this armed

^m See the annexed plate, figure C.

thimble be put on the middle or ring finger, we can then accomplish two ends with that hand. With the fore finger we draw down the eye-lid, and with the middle or ring one we secure the eye; in other respects it is to be used in the same way as Pamart's.

When this instrument is inserted in an oblique manner into the eye, all that it does is to prevent the rotation inwards; but those who wish by its means to prevent every involuntary motion of that organ, must apply it in such a manner that the instrument be at right angles with that point of the eye which it touches; and in this manner every motion may be prevented. In such a case the instrument ought to be applied before the knife be entered; for in this way every beginner will be enabled to make use of it; whereas it requires a certain presence of mind, which young surgeons are not always possessed of, to introduce the knife, without first securing the eye in the manner just now mentioned.

For my part, I seldom make use of this instrument at all. I generally try to fix the eye by means of a gentle pressure of that finger which I use for drawing down the under eye-lid. As soon as the knife is entered, the
eye

eye generally stands still; I say generally, for it does not do so always.

It appears probable that this involuntary motion of the eye arises from a spasmodic contraction of some of the muscles of that organ, and that this happens from the irritation which the puncture with the knife occasions; but a dexterous and exercised hand can generally govern the eye by means of the knife alone, so that every other instrument for fixing it becomes unnecessary. This art is only to be acquired by practice. It is usual with some to cover the eye that is not to be operated on with a bandage, a step which affords some little assistance; for by thus preventing in some measure the rotation of the one eye, we prevent that of the other also. At all events Rumpelt's thimble may be kept on the finger in order to be ready for use, if necessary.

C H A P III.

On the Manner of cutting the Cornea.

THE method which I make use of is very simple, and, in this respect, distinguishes itself from most others, especially those of Davielⁿ and Sigwart^o. I only make use of a single instrument for cutting the cornea. The more instruments any method requires, the more difficult that method becomes, and the more apt it is to fail. It is not possible to cut or puncture the eye with a number of instruments, and again remove them, without irritating, bruising, or injuring it in many different ways. The more simple the operation the easier and surer it is.

We cannot raise our arm high, nor stretch it far out, without losing that command over it,

ⁿ His method is described in the Mem. de l'Acad. de Chirurgie, tom. v. p. 369.

^o See his Thesis de ultro perficienda Cataractæ Extractione. Tubing. 1752, which is also printed in Halleri Diss. Chirurg. t. ii. p. 207.

and that degree of steadiness, which is so much required in this operation.

On this account, the surgeon ought to be seated on a pretty high chair, and the patient on a low one, so that the head of the latter may reach the height of the surgeon's shoulder; by this position the operator will not be obliged either to raise or lower his arm too much. The feet of the patient ought to be stretched out below the chair on which the surgeon sits, and the head of the former ought to be brought as near to the breast of the latter as possible. If this be observed, the surgeon will find that he need only stretch his hand out a very little in order to perform the operation; besides, by being thus enabled to keep the upper part of his arm close to his side, he acquires a steadiness and command of the whole arm and hand.

The patient must sit in such a manner that the light falls obliquely over his nose into the eye to be operated on. If he be placed so that the rays of light from the window fall in a direct line on the eye, the surgeon will find that he is obliged either to sit in his own light, or that the reflection in the pupil tends to embarrass him.

As soon as the other eye is covered, let an assistant step behind the patient, and if it be the left eye which is to be operated on, let him place his right hand under the chin of the patient, and keep the head firm against his breast. The left hand he must place on the forehead, and with the fore and middle fingers he must raise the upper eye-lid. The surgeon pulls the under one down with the fore finger of his left hand, whilst he performs the operation with the right.

The principal part of the operation is the incision through the cornea. This must be done with a single instrument, and with one cut; if it be intended that the edges of the wound should be equal and uniform, and if it be expected that the wound should heal soon, and leave no ugly scar behind.

If, like Daviel, Sigwart, and others, we first open the cornea with one instrument, and then enlarge this opening by others, the wound will be unequal, will heal with difficulty, and leave a very ugly cicatrix behind.

The incision must be made with a knife, and not with scissors, which last always make a contused wound that has a tendency to run into suppuration, and heals with difficulty,
besides

besides leaving a disagreeable blemish; but a knife makes a clean and good-conditioned wound; for which reasons we see why the methods of Daviel and Sigwart are to be rejected.

The knife which I use is different from every other knife intended for the same purpose^p. Simple as it may appear, there are still a great many things to be remarked concerning it. It may, perhaps, be supposed, that more depends on the hand that guides the knife, than on the knife itself; and there is some truth in this; but we shall soon be convinced that the ease and nicety with which the operation is executed depends very much indeed on the structure and make of the knife; and who would not rather use a convenient knife than such a one as is managed with difficulty and inconvenience?

One of the great requisites in this operation is, not to allow the aqueous humour to flow out until the incision be ended. Should this liquor be discharged sooner, the anterior chamber of the eye falls together, the cornea becomes soft and flabby, the iris comes in con-

^p See the plate fig. B.

tact with it, and it becomes almost impossible to finish the incision without either lacerating this last-mentioned membrane or the internal surface of the cornea; besides, the incision cannot be made equal, and the whole operation fails.

In order to avoid these inconveniences, we must, in the first place, make use of one instrument only. If we make use of more than one, as Daviel does, the consequence is, that as soon as the first one has punctured the cornea the aqueous humour flows out, the anterior chamber of the eye collapses, and the second and third instrument, with which the first opening ought to be enlarged, cannot be introduced without irritation, or without lacerating and injuring the eye.

In the next place, the blade of the knife must be constructed in such a manner that it gradually increases in breadth from the point to the heel, in order, both to enlarge the wound as it passes along, and also to fill up the incision as it is made, and thus prevent the discharge of the aqueous humour. Both Mr. Beranger's knife^a and mine are of this shape;

^a See the plate fig. C.

and all others that are not so constructed are worth nothing.

There are many surgeons who make use of knives of a similar form, and who yet cannot prevent the too early evacuation of the aqueous fluid, merely because the blade of the knife is not broad enough at the part where it ought to be broadest. The inconvenience that arises from this is, that when too small a knife of this kind is already pushed through the anterior chamber, the inferior portion of the cornea still remains uncut, and, in order to finish the incision, the surgeon is obliged to draw the knife back again, and thus make a second incision; but as soon as the instrument is drawn back in the smallest degree, the wounds are no longer completely filled up, the aqueous humour flows out, the iris slips under the edge of the knife, and is liable to be cut by the first move that it makes.

I do not assert that this always happens, but it does so frequently; and in such a case, not even the most dexterous hand can avoid cutting the iris *. This, indeed, may in some degree

* In order to prevent the iris from slipping under the edge of the knife in such cases, many oculists withdraw their fore-

degree be avoided by turning the edge of the knife a good deal forward ; by which means the back being applied to the iris, that membrane may be kept from sliding under the instrument, and the incision finished. In attempting to do this, however, we run a great risk of making the opening in the cornea too small ; a circumstance which is attended with much inconvenience, as we shall mention afterward.

Mr. Beranger is, as far as I know, the first who pointed out the manner of avoiding all these difficulties.

The whole depends upon this ; that the knife with which we are to cut the cornea

finger from the under eye-lid as soon as the knife has traversed the anterior chamber, and placing it on the cornea, press that membrane against the instrument, by which means no space is left between them into which the iris could possibly fall. By this method the surgeon generally obtains the end he had in view, that of avoiding the injuring the iris ; and therefore in all cases, where the knife to be employed is not of the construction described by the author, it ought not to be neglected. It is liable, however, to two inconveniences ; the one, the additional irritation which it necessarily produces, and the other, the embarrassment which it generally occasions to a young practitioner ; for that part of the cornea through which he has now to cut being greatly hid by the finger, he is apt either to make an unequal incision, or to cut too small a segment of that membrane.—The T.

should,

should, at its broadest point, be fully as broad as half the diameter of the cornea. The cornea is in general about six lines in diameter; the knife, therefore, must, at a certain point, be three lines in breadth, taking it for granted, however, that no more than the under half of the cornea is intended to be cut through, and not two-thirds, as Daviel recommends. In using a knife, such as I have described, we shall find that as soon as it has traversed the anterior chamber, and that that part of its blade which is three lines in breadth enters the eye, then the inferior portion of the cornea will be divided. It is unnecessary to draw the instrument back. The whole is done with one cut, and the aqueous humour does not flow out before that is finished.

The knife must always be pushed on till that part of it which lies between *m* and *n*, *fig. B*, enters the anterior chamber of the eye. When this happens, the point of the knife projects at least seven lines beyond the cornea; for that part of the blade of my knife, which is three lines broad, is at least ten lines distant from the point; wherefore it may be asked, if in such eyes as lie deep there be no danger that this projecting point lacerate some part

at the internal angle of the eye, and thereby produce a sudden motion of that organ so as to disturb the whole operation?

It may seem, as if the knife of Mr. Beranger (*see figure C.*) possessed a superior advantage to mine. The blade of his knife increases in breadth more rapidly, for the broadest part of it (*see q.*) is only eight lines from the point. When this part, therefore, enters the anterior chamber of the eye, there is not above four or five lines of the instrument which projects, and consequently less risque of wounding any part of the internal angle. From all which we might suppose, that my knife should have the preference in performing on large and prominent eyes, and Beranger's on small hollow ones.

However reasonable such a conclusion may appear at first, still I think I have good grounds for asserting that mine ought to be preferred in both cases.

It will in general be found that it is of much easier management than Beranger's. The blade does not grow broad quickly, and therefore cuts the cornea slowly, which allows the surgeon time to pay attention to every thing, and to correct the most minute

minute faults which may occur in the direction of the knife. Beranger's knife, on the contrary, grows quickly broad, and cuts the cornea rapidly as it is pushed forward through the anterior chamber of the eye. On this account great dexterity is required on the part of the surgeon; for the celerity with which the incision is carried on is liable to prevent him from giving a different inclination to the knife, by which he might correct certain small faults. Besides, this knife of Mr. Beranger's is, from its form, liable to another inconveniency; I mean, it requires a much greater degree of force, in order to overcome the resistance of the cornea; and it frequently happens, that although we do make use of a great force in order to accomplish this end, instead of thereby causing the knife to enter the eye, we shall push that organ before it, and force the cornea into the internal angle; and this merely because, from the quick increase of breadth, the resistance which the cornea makes cannot be overcome; a circumstance concerning which I have already spoken in the foregoing chapter. But my knife is subject to none of these inconveniences; and the danger of wounding any

part of the internal angle may be easily avoided by turning the eye much outward before beginning the incision; or if it should turn inward during the operation, by again drawing it back with the knife. This is very easily done as soon as the point of the knife makes its appearance at the internal angle of the eye.

The blade of my knife is about an inch and a half in length. It is convex on both sides.

Whilst the knife traverses the anterior chamber of the eye, the convexity of its side presses the iris back, and keeps it from falling under the edge. A convex blade also is easier pushed through the cornea than a flat one, and it does not rub so much on the iris.

The point of the knife must be sharp on both edges, for at least the breadth of one line, in order that it may enter quickly and easily.

Particular care ought to be taken that the point of the knife be well-conditioned. I have seen it happen, that the point of the knife has bent on the cornea. If such a knife be not very sharp it does not enter, and upon the surgeon's making use of more force it suddenly

suddenly pierces the cornea, and lacerates the iris*.

The back of the knife must be made perfectly blunt, and that for many reasons. As we push the knife forward its back ought to be turned a little towards the iris, as we shall mention more particularly afterwards; but this would be impossible were it sharp, from the risk we should run of wounding that membrane. It often happens, during the operation, that the upper eye-lid slips from under

* The author, with his usual perspicuity, takes notice of a fault in the construction of the knife, which is but too common, and which it is of the utmost importance to discover; but it has escaped him to point out wherein that fault lies, so as to enable the young surgeon to judge whether the knife which he is about to employ is faulty or not. The great error consists in making the point too thin and too flexible; in a word, too much like the point of a lancet. A knife, whose point is so constructed, subjects the operator almost to a certainty of lacerating the iris. It is true, that with a little dexterity, especially if the point be very sharp, the knife may be made to enter the chamber of the eye with apparent ease; but as soon as it comes in contact with the opposite and internal surface of the cornea, owing to the density of that membrane, and the obliquity of its direction, the thin flexible point is reflected inward, and unavoidably lacerates the iris before it can be pushed through. Particular directions ought, therefore, to be given to the instrument-maker to have the point made pretty strong and firm, although not rigid nor inelastic.—The T.

the finger of the assistant. In such a case it must be unavoidably wounded, which either produces a convulsive contraction of both eyelids, or a sudden rotation of the eye. I have seen this trifling circumstance produce a most unsuccessful operation. Lastly, it is evident that a knife whose back is made sharp, such as *Poyet's*, must cut the cornea both upward and downward, which is quite contrary to the intention of the surgeon, who only wishes to cut the inferior half of that membrane; for which reason the knife ought to cut downward only.

The back of the knife must not, therefore, be sharp, nor must it be too thick. The thinner the better; for when it is thick it dilates the upper angle of the wound too much, causing a small opening at the top, through which the aqueous humour may flow out. The back of my knife is thin, and does not, therefore, produce that inconvenience. I must here take notice that the person who sharpens the instrument, very often, through inattention, sharpens it on the back, especially near the point. This neglect may be attended with bad consequences if not discovered. For my part, before making
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ing use of a new-sharpened instrument, I always pass the back of it over a fine stone.

The back of the knife must be perfectly straight; not bent nor curved. The intention of the surgeon is to separate the under half of the cornea from the albuginea. The knife must, therefore, be made to pass at the external angle of the eye, and enter the lucid cornea in the direction of its transverse diameter, and near to the albuginea; in which direction it must be pushed forward till the point appears at the opposite side of the cornea equally near the albuginea. A knife perfectly straight on the back, which is made to enter the anterior chamber of the eye, at the external point of the transverse diameter of the cornea, will easily follow that direction, and come out exactly at the opposite point; but, on the contrary, if a knife be made use of whose back is curved or bent, it must happen that the point, although entered exactly opposite the center of the cornea, will come out much lower at the opposite side; and indeed, always the lower the more bent it is. It is true, this fault may be corrected by elevating the point of the knife in the chamber of the aqueous humour, as soon as it approaches the inside of the eye,
and

and then pushing it through the cornea. But that is a particular manœuvre that requires much attention, and renders the operation at least more difficult; for the fewer steps there are in any operation the easier will that operation be.

The employment of a knife with a curved back is also subject to another inconvenience. As soon as the knife has fairly entered the anterior chamber, its back ought to be turned a little towards the iris; but if it be much bent or curved, it presses and irritates it too much. The knives of Mr. La Faye', Warner', and Sharp', are all curved on the back, and on that account not so convenient, and less to be depended on, than mine.

The place in the cornea where the knife is to be entered must be at least a full half line distant from the albuginea; and the same distance must be kept as nearly as possible at the opposite point where the knife is made to come. In one word, the wound must be semi-

* See Mem. de l'Academie de Chir. de Paris, t. xi, pl. 20, fig. K.

† See his Cases in Surgery, p. 91, pl. 2. fig. 1.

‡ See Philos. Transactions, vol. xlviii. pl. 1. p. 161; and Mem. de l'Acad. de Chirurgie de Paris, t. xi. pl. 22. fig. 2.

circular,

circular, and every point of its edge a full half line, or rather a whole one, distant from the albuginea.

If the knife be made to enter too near the line which unites the cornea and albuginea, there is a great risk of immediately wounding the iris, for at that place it is almost contiguous to the cornea ; or, if the surgeon, having unguardedly entered the instrument too near the albuginea, and, afraid of wounding the iris, turns the point of it forwards, there is a risk of his only cutting between the lamellæ of the cornea, without ever entering the chamber ; a circumstance concerning which I shall speak a little more fully afterwards. The nearer to the albuginea the incision is begun, the nearer does the knife approach the iris in passing through the anterior chamber, and consequently the greater is the danger of wounding that membrane. This danger is considerably augmented by this ; that during the operation that membrane advances and approaches the cornea. I recollect one case where the iris was pressed so near the cornea that it was impossible to make the instrument pass beyond the pupil, although in this instance the knife had not been entered too

near

near the albuginea. As soon as the operator attempted to push the knife on to the other side, it went in at the pupil. I am apt to believe, that as soon as the knife has entered the eye, the muscles become spasmodically contracted, and, by squeezing the globe of the eye, occasion this projection of the iris. I think I have also observed, that when the inferior edge of the wound is made too near the albuginea, the iris and vitreous humour are very apt to be prolapsed.

If we wish that the point of the knife should come out at the same distance from the albuginea at which it was made to enter, it becomes absolutely necessary that the blade should be perfectly strait. If it be bent to one side, like La Faye's, the point will be turned from the iris towards the cornea. It is true, that in this case there is little danger of wounding the first of these membranes; but there is a very great one of lacerating the inner surface of the latter; besides, with such a knife, it will be found almost impossible to prevent the point from coming out at too great a distance from the albuginea, and consequently from making the wound too small; or, if we use our endeavours to prevent this,
and

and attempt to make the knife come out nearly at the same distance from the albuginea at which it was made to enter, we must press the blade very much backward, and thus endanger our squeezing or cutting the iris. *La Faye's* knife seems to me on this very account to be more inconvenient than any of the others.

The best situation of the eye for operating on is, when directed a little upwards, and outwards, and in no other situation ought the knife to be introduced. I speak from experience, and can assert, that the operation will be always the more difficult, the more the eye varies from that position during the moment of introducing the knife.

I myself once acted much against this rule. The eye was turned so much upwards, and inwards, that the greatest portion of the cornea was concealed under the upper eye-lid. The patient had lost all command over it, and my entreaties that he should direct it downward and outward, were of no avail. After having waited a long time in vain, in expectation that the eye would change its situation, I at last entered the knife, in the hopes that I should be able to move the eye by means of
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that instrument; but the eye remained fixed and immoveable. It was quite impossible for me to make it move. I therefore found myself obliged to withdraw the knife, and to renew the operation some days after, when the wound was healed.

It shall often happen that the fear and anxiety which the patient experiences immediately before the operation, occasion a kind of cramp, or spasmodic contraction of the muscles of the eye, by which means that organ is either thrown into convulsive motions, or rendered immoveable.

If the eye be immoveable, and at the same time in a good position, nothing more favourable for the operator could possibly have happened; but if it be in a bad situation, the surgeon ought by no means to attempt the incision; for as soon as the knife begins to penetrate the cornea, an additional stimulus is given, and if at that time the eye should happen to be in motion, it may be rendered immoveable by doing so; or if it be without motion, it may become still more fixed, so that the operator will find it impossible to force the eye into any other situation. I do not assert that this always happens, but it does
so

so frequently; and that will be a sufficient ground of caution to a prudent surgeon.

When about to begin the incision, the point of the instrument ought to be directed towards the iris, so that the knife may form a right angle with that point of the cornea which is intended to be first cut; for, if it be applied obliquely to the cornea, which it necessarily must be if the knife be directed towards the internal angle of the eye instead of towards the iris, the consequence is, that the whole incision of the cornea will be rendered oblique, and the opening too small; nay, it may happen that the knife, instead of entering the anterior chamber of the eye, shall glide between the lamellæ of the cornea. This once happened to myself, and now and then also to my pupils when exercising themselves on the dead subject. It is most liable to happen in those whose cornea is but little convex, which easily accounts for its often occurring in the dead subject, where the eye soon loses its natural convexity, and becomes shrivelled.

The fault is in general easily detected by the uncommon resistance which one feels in forcing the knife between the lamellæ; and yet I have seen it twice happen, in exercising

on the dead body, that the lamellæ have been separated the whole length from the external to the internal angle, without having once entered the anterior chamber.

If the fault be discovered in time, nothing is to be apprehended from it. The knife must be withdrawn, and again entered in a better direction. In the case where I committed this fault, there did not remain any mark of the separation. If, however, it be not soon detected, and if the knife be pushed pretty deep into the substance of the cornea, there is great reason to dread a future obscurity of that membrane.

As soon as the point of the knife has fairly entered the anterior chamber, its direction must be altered. Instead of continuing to point it towards the iris, it must be directed to that opposite point of the cornea where we mean that it should come out, and then pushing it gradually forward in the same direction, we must turn its back gently towards the iris. By doing this, as the edge is turned towards the cornea, we shall avoid wounding the iris, which is generally pushed forward during the operation.

I have observed that this last step is generally
executed

executed with some difficulty. The operator does not turn the back of the knife to the iris until it has entered the chamber, by which means the wound is stretched open, and the aqueous humour is apt to flow out.

For this reason I now introduce the knife in such a direction that its back is a little turned toward the iris, so that I have no need to alter it afterwards*.

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* One of the greatest requisites in this operation is to make the opening in the cornea sufficiently large. If the knife be inserted at about the distance of a sixteenth of an inch from the albuginea, and made to preserve that distance throughout the whole incision, the opening will be generally found of a sufficient size, but not more than sufficient. How is it possible, however, to do this if we give the knife that oblique direction which the author has just now advised? If, according to his directions, we incline the back of the instrument to the iris, and consequently turn it's edge forward, and that we are to preserve this direction throughout the whole incision, is it not evident that an oblique direction will be given to the wound, and that, towards the inferior part of the cornea, the edge of the knife will come out at a greater distance from the albuginea than that at which it was made to enter? It may be said, indeed, that the intelligent author desires that this inclination of the knife should be very slight; but if it be very slight it will not answer the purpose he intends, and if the back be turned so far backwards as almost to come into contact with the iris, it will be the cause of a narrow and contracted incision.

With a well-formed knife, such as that which the author

I have said, that as soon as the point of the knife is in the anterior chamber, it must be now directed towards the internal angle of the eye ; but it sometimes happens that the operator conceives it to be in the chamber when it is not so in reality : an unlucky mistake ; for if the direction of the knife be now altered, and pointed towards the inner angle, the knife is apt to slip between the lamellæ.

The knife must be entered with a degree of quickness, and yet with caution. For if we attempt to enter it slowly, the eye is apt to move suddenly, and we run the risk of wounding either the albuginea or cornea ; but if we make the first incision quickly, we can generally secure the eye from moving.

And now a question arises : How large ought this opening in the cornea to be ? Whether shall we follow the advice of Mr. Daviel, who recommends cutting at least two-

describes, the precaution is unnecessary ; for if the aqueous humour be not allowed to escape too soon, and the incision not begun too near the albuginea, the iris seldom begins to be pushed forward until the point of the knife pierces the cornea at the inner angle of the eye ; and then we can always prevent it from slipping under the edge of the instrument, by withdrawing the fore-finger from the under eye-lid, and gently pressing the cornea against the knife.—The T.

thirds

thirds of the cornea, or my advice, which is to cut one-half only? When we cut two-thirds, we most undoubtedly procure a large and free opening, through which the lens can easily pass, and through which we can easily introduce any instrument that may be found necessary. I think I have observed, however, that the greater the opening the more danger there is of a prolapsus, both of the iris and vitreous humour; and, indeed, it is not difficult to account for this; for it would seem as if these two parts of the eye were pushed forward in consequence of the retraction of the coats of the eye, which takes place as soon as the incision is made; and if two-thirds of the cornea be cut, there is certainly much less resistance than where the half only has been separated; besides, so large an incision as this, requires more dexterity, and a much broader knife than mine. Both my knife and that of Mr. Beranger are calculated to cut one-half of the cornea only; but if the operator wishes to divide about two-thirds of that membrane, he ought to have a knife which measures at least four lines at the broadest part of its blade. Such a knife, however, will be found to be more difficult of ma-

nagement than mine. All these are only so many unnecessary difficulties to which the operator subjects himself; for the opening will be found sufficiently large if we cut the half only.

At the same time it is of the utmost importance to know that the surgeon is exposed to much greater difficulties than these just now mentioned, if he cuts less than the half; for here the opening will be too small, and not only render the extraction of the lens extremely difficult, but prevents the easy introduction of such instruments as are necessary to open the capsule, or to extract any part of the lens which may be left behind. In order to force the lens out of such a wound as this, it is necessary that the lens, as soon as it has passed through the pupil, should sink to the lower part of the anterior chamber, and in doing this it either pulls the iris forcibly along with it, and hurts the tone of the fibres, or it alters its shape, or ruptures it, or pushes it out of the eye. All these difficulties may be avoided by observing a proper medium, and by cutting neither more nor less than one-half of the cornea; or, if we are to do one of them, for it is not always in our power to follow
exactly

exactly the rules which art prescribes, less harm will be done by dividing rather more, than by dividing less than one-half of the cornea.

It happens now and then, that the incision is made too small, which accident is most apt to take place, even with a very experienced and dexterous operator, if the eye be turned towards the inner angle. If the opening be small, and that only in a very small degree, the fault is trifling, and will not prevent the happy success of the operation. If it should be considerably less, however, than what it ought to be, the operator had better desist from all further attempts to finish the operation, otherwise he will fall from one error into another. I myself have done so twice, and can therefore speak from experience. It is supposed by many, that if the opening be not remarkably small, it will still be sufficient to admit of a passage for the lens. Full of these hopes, the surgeon proceeds to open the capsule, and to make a pressure on the eye; but in vain; the lens does not move: he presses still stronger, and a portion of the vitreous humour starts suddenly forward, leaving the lens behind. As often as the pressure is renewed, so often

does another portion of the vitreous humour flow out, the cataract still remaining. I do not attempt to explain this circumstance; but the fact is certainly so. The consequence is, a most violent inflammation, which inflammation, caused chiefly by the repeated pressure the operator made on the eye, is very apt to run into suppuration.

When the incision is well made, the lens comes into contact with the iris as soon as the aqueous humour has flowed out, and then enters the pupil. This is a good sign. On the other hand, when the incision is too small, the lens remains in its situation, although the aqueous humour has entirely flowed out. This is a bad symptom, from which we may with certainty conclude, that upon pressing the eye we shall rather force out the vitreous humour than the cataract.

If the surgeon, therefore, perceives that the incision is too small, and that the crystalline lens does not move forward after the aqueous humour has flowed out, he ought, most undoubtedly, to desist from making any pressure, for as yet there is nothing to fear; the fault may be corrected by enlarging the opening, and the operation may be happily executed.

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In such a case as this, I would make use of a small knife, whose blade was bent, and whose point was blunt. This knife I would cautiously introduce into the incision, and first enlarge one corner of the wound by cutting upwards, and afterwards by doing so to the other. After that is done, the capsule may be opened, and the lens pressed out. Should the operator, however, have no such knife with him, he had better desist from prosecuting the operation any further, and bind up the eye. The wound in the cornea heals in a few days, and the operation may be again renewed. I have done so once myself, and the operation, in which I failed the first time, succeeded very well the next. Such a failure, most undoubtedly, diminishes the confidence which the patient formerly put in the surgeon; but with a little presence of mind, the real nature of the case may be concealed from him; and even supposing this to be impossible, it is much better that the patient should, for a few days, lose his confidence in his surgeon than lose his eye; I say, for a few days; for the eye does not suffer much, the inflammation is not so great, and all is again well in a few days.

But if the operator has begun the pressure
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on the eye, in expectation of thus extricating the cataract, without having recourse to the previous enlargement of the wound, and that he has forced out a little of the vitreous humour, then, indeed, is the success of the operation very doubtful. He may, perhaps, be able to catch hold of the lens with a small hook, and thus extract it; I say, perhaps; for I confess never to have seen it attempted, and I believe it will be found very difficult. Supposing, even, that we at last succeed, the eye having suffered so much, the most dreadful symptoms are to be feared. I have observed, that in those cases where the vitreous humour has been forced out, and the cataract left behind, there has always followed a closing and concretion of the pupil.

Particular attention ought to be paid to the sharpness and good condition of the instruments we employ. The cornea is sometimes so very hard that it makes a kind of hissing noise, which even the attendants may hear.

I have once observed, that the point of the knife bent upon the cornea.

If the knife be not sharp enough, it will push the eye inwards, rather than penetrate
the

the anterior chamber ; or, perhaps, the cornea may yield a little to it, and, as soon as the surgeon uses a greater force, it suddenly gives way, and the knife goes too deep into the eye.

I once operated a peasant for the cataract, who had a thick whitish cicatrix at the lower part of the cornea. It was necessary that I should cut through this in the course of the incision ; but I found it impossible, whatever force I employed ; and as I had no other instruments with me I was obliged to desist from the operation. The day following, I cut through the cicatrix with a pair of scissors, and finished the operation. This is, perhaps, the only case where the scissors are necessary. In a case of this kind the question arises, Whether we may not cut the upper instead of the under half of the cornea ? I do not make the smallest doubt of its practicability, and know that Baron Wenzel once performed the operation successfully in this way.

During the operation, the eye-lids must be drawn as much asunder as possible, but with the fingers, and not with instruments. The assistant who supports the upper eye-lid, must take particular care not to let it slip down during

ing the operation. This, however, is very apt to happen, for the eye-lids become wet, and are often convulsively drawn together as soon as the knife begins to enter the eye; besides, the assistant is often inclined to pay more attention to what the operator is about, than to what he himself is engaged in. This accident, therefore, is very liable to happen, and when it does so, it disturbs the operation exceedingly. The finger, with which the assistant ought to support the eye-lid, ought to rest and be pressed against the upper border of the orbit, but on no account to press upon the ball of the eye. Should the assistant happen to do so through inattention, not only the lens is made to spring forward as soon as the incision is finished, but a portion of the vitreous humour also.

Small and hollow eyes are difficult, but large and prominent ones easy to operate upon. I have performed this operation on some whose eye-lids were so much contracted, that upon raising the upper one the under eye-lid was drawn up alongst with it, and *vice versa*, when the under one was pulled down the upper one followed. The embarrassment which this occasions may in some degree be lessened
by

by separating the eye-lids from each other rather towards the inner angle of the eye.

I have also twice observed, that upon lifting up the upper eye-lid, the ball of the eye has been directed upwards. Perhaps this was owing to an adhesion of that part of the tunica conjunctiva which covers the eye to that part which lines the upper eye-lid. In these cases I caused the upper eye-lid to be but moderately raised, drew the under one as much down as possible, made the patient direct his eye downwards, and successfully performed the operation.

The chair on which the patient sits ought to have a back, which should reach as high as his shoulders, in order to prevent his shrinking backwards during the operation. The assistant should also lean a little against the chair, in order to keep both himself and the patient's head steady. If the operator causes the patient to direct his face upwards, he can rest his hand with much firmness and security on the patient's cheek; but if the patient holds his head in his usual way, the surgeon will find but little support, in comparison with the other way, although he rest his hand on the cheek of the patient.

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I cause the patient to be seated near any one window, whilst all the curtains of the other ones in the room are let down. It is absolutely necessary that the surgeon should see clearly what he is about, during the time he cuts the cornea; and for that reason I always cause the curtain of that window at which the patient is seated to be completely drawn up at the beginning. As soon as the incision is finished I let the curtain down, and only allow as much light to fall into the eye as I find sufficient. By this means the pupil is dilated, and I not only introduce the instruments to puncture the capsule with safety, but I by that means facilitate the issue of the lens.

As soon as the cataract is extracted, I again draw the curtains up, and examine the pupil with the most scrupulous attention. But enough of this, lest I should employ too much time with things which, in the eyes of some, may appear trifling.

C H A P. IV.

On the Method of opening the Capsule of the Crystalline Lens.

TH E next step to that of cutting the cornea is the opening the capsule. Many look upon this part of the operation not only as unnecessary but as dangerous. It is certainly true, that in some cases, as soon as the incision in the cornea is finished, the crystalline lens slips forward of itself, although the capsule shall not have been previously punctured, and in other cases it can be forced out with the slightest pressure; but this does not happen always. The capsule of the lens is sometimes so thick and dense that the cataract cannot be forced through the pupil even with a very strong degree of pressure; if in such a case we increase the pressure still more, the capsule suddenly gives way, and both the lens and vitreous humour start out. Nay, it sometimes happens, that this part resists all the pressure we employ; and then, if we employ
more

more force, we only force out the vitreous humour alone, leaving the lens behind; or the capsule loofens itself in its whole circumference from its adhesions, and starts out entire and enclosing the lens. I have two lenses in my possession, which I extracted, and which are both covered with their entire capsules. In these cases I only made use of a gentle pressure, and the operation succeeded wonderfully; from which we may conclude, that this part can sometimes be very easily brought away, and that in such cases it is not only no bad accident, but on the contrary a very desirable one, as it frees the patient from the risk of a secondary cataract (*cataracta secundaria*). This is not the case, however, with that violent and forcible separation of the capsule, about which we have just now been speaking, and which never takes place without lacerating or otherwise injuring the internal parts of the eye.

Mr. Janin has observed that, when the capsule is lacerated by a violent pressure on the eye, it generally becomes obscure after the operation, occasioning either a weak vision, or a second blindness; and that, on the contrary, when it is opened with a sharp instrument it
generally

generally remains clear and transparent. These different effects are easily to be accounted for. When, without having punctured the capsule, we employ a great pressure, the lens is necessarily forced forward, and must consequently bruise and distend the anterior portion of the capsule, till not being able to resist the pressure any longer, it is torn, and gives way. The consequence of this injury is a violent inflammation, which occasions an opacity of its coats; whereas, when an opening is made in the capsule by the operator, the lens enters that opening, and dilates it in its passage out, without much violence: hence we find, that where this is attended to, the capsule suffers but little, and remains clear and transparent.

It has in general been remarked, that when the capsule has been opened, the lens comes gently and slowly forward, gradually enlarging the orifice until it at last falls out of the eye. By this slow progression of the lens the capsule suffers but little, and the success is as wished for.

I do not assert that this step of the operation, I mean the opening of the cornea, is without its difficulties and dangers. If the eye should happen to move suddenly whilst

we are introducing the instrument into the pupil there is a great risk of wounding the iris. I can, however, assert, that the greatest part of the danger arises either from the want of caution in the surgeon, or from the bad make of the instrument. In general the eye remains motionless at this time, and the lens is pressed so much forward, after the aqueous humour is evacuated, that there is but little difficulty in opening its capsule.

As soon, therefore, as the incision in the cornea is completed, and that the aqueous humour has flowed out, we ought to proceed to open the capsule. In doing this we must not content ourselves with only puncturing it once. This must be repeated several times. There are many good reasons which induce me to advise this pretty strongly. It happens now and then, that in extracting the lens a small portion of it is left behind, which requires to be taken out afterwards by itself, but is not to be accomplished without a good deal of trouble. This happens but seldom, however, if the anterior portion of the capsule has been well punctured; for an easy and free passage is thus procured to all that
is

is contained in it. Nothing opposes itself to the exit of the lens there, nothing capable of retaining any fragments, and the most gentle pressure with the finger on the eye, aided by the retraction of the elastic coats of that organ, force every thing out of the capsule which had become opaque. Those who only make one puncture in the capsule cannot expect this. It is true, the opening enlarges, but as a large portion remains still uncut and unopened, it is easy to conceive that a portion of the lens may remain behind: allowing this explanation to be either true or false, still it is a certain fact, drawn from observation, that the less the capsule has been opened by repeated punctures, the more readily is a portion of the lens retained.

The small portion of opaque lens, which now and then remains in the capsule, must be extracted by means of a small scoop, and, in order to do this it becomes absolutely necessary that the scoop should enter the capsule through the opening which was made in it. When this opening is large and wide, the scoop will easily get in, and reach the opaque fragment; but, on the contrary, where the opening is small, it is all in vain that we move the scoop

in every direction, in hopes of laying hold of it ; for the scoop is on the outside of the capsule, and cannot procure an entrance.

I have seen it happen, that every endeavour to extract the remaining fragment has been in vain. In such a case, it was supposed by the operator to adhere to the capsule ; but that was not the cause. It is more probable that the capsule had not been sufficiently opened, and that the scoop could not reach the small portion.

Let us suppose, that a small opaque fragment remains ; and let us also suppose that it is impossible to extract it with Daviel's scoop. If the capsule has been previously well punctured and opened, we may hope that part of the aqueous humour will enter the capsule, and dissolve the fragment. This happens at least now and then, and always the more readily the larger the opening in the capsule has been. I shall again take notice of this circumstance afterwards.

To these reasons I have still another to add. It has been observed by some, that the loose portions of the capsule now and then become opaque after the operation, and either weaken the sight very much, or totally ob-

struct it. In order to remedy this, Daviel advises the surgeon to pull out these opaque portions by means of a pair of small forceps, or by means of a hook. But how is this possible? they only turn opaque some days after the operation, and by that time the wound is quite closed.

These opaque pieces of the capsule, which some fear so much, I have never seen; and perhaps I owe this greatly to the method I take of cutting and puncturing that membrane as much as possible. At all events, these little opaque fragments are not to be so much dreaded; for Mr. Sharp has observed, that they generally disappear of themselves in the course of time.

If, alongst with the lens, part of the capsule be also opaque, it becomes highly necessary to annihilate, as it were, the anterior lamella of that membrane, else the patient would remain blind after the lens was extracted. It is generally impossible to know, *a priori*, whether the capsule be opaque or not; and hence we will surely act with most prudence if we destroy it as much as possible. It is true, means have been proposed for remedying this opacity of the capsule; but these means are not

so sure or easy in their application as not to make us wish to render them unnecessary.

Mr. Thenon^u cuts the capsule crossways, with an instrument made for that purpose^x. Mr. Daviel^y makes a circular incision, in such a manner as to disengage entirely the middle portion; but there is no necessity, and, indeed, it is no easy matter to make the incision of any particular form.

Mr. Beranger raises that portion of the cornea which has been loosened, by means of a pair of small forceps, and then opens the capsule with the point of the knife with which he divided the cornea.

Mr. Daviel raises the cut-half of the cornea with a spatula, and punctures the capsule with the point of a double-edged couching needle; but this is very dangerous; for if the surgeon's hand happens to tremble, or that the eye moves, the iris may be immediately wounded.

The forceps of Mr. Beranger bruises and injures the cornea; and the spatula of Mr. Daviel is very inconvenient; for, by the smallest

^u In his *Theses de Cataracta*.

^x See fig. D of the annexed plate.

^y See *Mem. de l'Acad. de Chir. de Paris*, l. c. p. 325.

motion of the hand, the cut segment of the cornea slips from it, and the cornea must be again raised; but this can never be done without a little injury to the iris. Besides, in order to use either the spatula or forceps, the surgeon ought to have his left hand quite at liberty; but this is already engaged in drawing down the under eye-lid; or, if he entrusts this last to the care of an assistant, it will, as I have already taken notice when speaking of Pamart's spear, always occasion a good deal of embarrassment.

Mr. Tenhaaf performs the whole operation with Mr. La Faye's knife. After he has got the knife opposite to the pupil, he depresses its point, and punctures the capsule, and then proceeds to finish his incision. How it is possible thus to sink the point of La Faye's knife, which is bent forwards, and away from the pupil, is to me inconceivable. Monf. Wenzel asserts, that he opens the capsule in the same way with Mr. Tenhaaf; he makes use, however, of a straight knife. I confess it is much easier to do this with the point of a straight knife, than with that of a bent one; but still all difficulties are not removed.

Both Wenzel and Tenhaaf always run the

risk of puncturing the edge of the iris in performing in this manner, and neither of them are able to open the capsule so sufficiently as it ought to be, and as I have already described.

Perhaps I venture too far, when I thus take it upon me to throw even the slightest blame on Baron Wenzel, that celebrated and that acknowledged very dexterous operator. The criticism, however, is, as I hope, well founded; and what is more, I am convinced in my own mind, and from what I have observed, whilst I have paid the strictest attention to his method of operating, that Baron Wenzel does not always perform what he wishes to make us believe; I mean, he generally leaves the capsule unopened.

The best and most convenient instrument for opening the capsule is the cystitome of Mr. La Faye^a. Both the blade of this instrument and its canula ought to be small and flat. Mons. Janin says, it ought to be as broad as possible, in order to make a large opening in the capsule; but it is very possible to make a large opening with a small instru-

^a See fig. H of the plate.

ment; we cannot, however, introduce a broad-pointed cystitome into the pupil without some danger of rubbing, bruising, or wounding the iris.

This instrument will be found to be of much easier management if its blade be curved than if straight; for, if it be straight, the surgeon, in order to introduce it into the pupil, must raise his arm, by doing which he loses the command and steadiness of his hand, and also prevents himself from clearly seeing what he is about. On the contrary, if the instrument be bent, there is no necessity for raising the arm. The surgeon may still rest his hand on the patient's cheek whilst he introduces it.

Near the end of the instrument, which is furthest from its point, there projects from each side a kind of wing or shoulder. When the surgeon is about to use the cystitome, he ought to place the fore-finger on one of these shoulders, and the middle-finger on the other, and thus holding the instrument pretty firmly, he ought to lay his thumb gently on the knobe at the top.

Before introducing the instrument, I generally press a little upon the eye with the fore-finger

finger of my left hand. This gentle pressure not only causes the lens and its capsule to advance a little forwards, but it also causes the pupil to dilate; by which means the cystitome is introduced with ease and safety, and allows a considerable portion of the capsule to be cut.

It happens, and that not unfrequently, that as soon as the incision in the cornea is finished, and the aqueous humour has escaped, the pupil immediately contracts. In such a case it is extremely difficult to introduce La Faye's cystitome the length of the posterior chamber of the aqueous humour, without danger of cutting the iris; and, indeed, supposing it to be safely introduced, we can then only make a very small opening in the capsule. It is here that the gentle pressure is of so much use; it widens the pupil, and facilitates the use of La Faye's instrument; besides, it tends to fix the eye at that very moment when the slightest motion is highly dangerous.

I take hold of the instrument with my right hand, and raising the cut portion of the cornea with its canula, I push it forward through the pupil. As soon as I have got it thus far, I press upon the knobe of the
concealed

concealed knife, and make it cut the capsule repeatedly. At the same time that I act thus, I move the instrument up and down in the pupil; I then allow the knife to return entirely within its canula, and withdraw the instrument.

With the same instrument, therefore, I raise the flap of the cornea, and puncture the capsule; in doing which my right hand only is employed; the left is engaged in pressing on the ball of the eye, or in pulling down the under eye-lid.

There is, however, one circumstance which I cannot omit to mention here; I mean the being very careful not to press too hard with the instrument against the capsule; for by doing so the ciliary processes may be torn, and a prolapsus of the vitreous humour ensue.

I remember one case where I could not force out the cataract, although I had made use of La Faye's cystitome, and applied such a degree of pressure as even to make me afraid of a discharge of the vitreous humour. As there were no circumstances which could make me suppose a concretion had taken place, I resolved to make use of La Faye's instrument again, and on doing so the cataract

was made to come out with the addition of a very gentle pressure. It is evident, therefore, that I had not pierced the capsule on the first application. Whether it be that this arose from the capsule's being preternaturally thick and dense, or that the point of the instrument was a little blunted from being in contact with the canula, still it teaches us this good lesson; that when the cataract does not seem inclined to come out with the usual pressure, and where there are no grounds to suspect any uncommon obstacle, we should again have recourse to La Faye's instrument before any thing else be attempted. Some suppose that a concretion has taken place between the cataract and iris, and set to work to loosen it, by which means the eye suffers very much without the smallest necessity for it. Others continue to increase the pressure, and at last not only force out the cataract, but the vitreous humour also. These latter always commit a very great fault; for we ought in no case whatever to apply a violent pressure to the eye. When the cataract does not come easily out we must endeavour to discover what it is that acts as an obstacle to it, and to remove it. The former may now and
then

then be right in their conjectures, as the resistance is in reality sometimes owing to an adhesion, but also often owing to the mere density of the capsule. In this state of uncertainty, therefore, we certainly act with proper caution and prudence in again making use of the cystitome; for if by doing so we are enabled to extract the lens, our purpose is gained; if not, we have almost obtained a positive proof of there being an adhesion, and that without having done any injury to the eye.

C H A P. V.

On the Extraction of the Lens.

AS soon as the capsule is opened the lens comes forward through the pupil, either of its own accord, or in consequence of a gentle pressure on the eye. In this part of the operation all kind of hurry is hurtful. The more cautiously and slowly we proceed, the surer we are of succeeding well.

The crystalline lens cannot pass through the pupil without considerably stretching and dilating it. If the lens be made to come rapidly out, it dilates the iris too suddenly, and tears or lames it. When this last circumstance happens, the iris loses its mobility, and changes its figure; a fault which unfortunately is no uncommon consequence of this operation, but which may be avoided by not applying a strong and sudden pressure, but by gradually and slowly increasing the pressure on the eye.

The slower the pupil is dilated the less does
it

it suffer; the more readily it yields the more surely does it contract after the lens has passed through it, and the sooner does it reassume its natural figure, mobility, and strength. The eye, says a certain author, must, as it were, be brought to bed.

Sometimes the cataract springs suddenly and unexpectedly forward as soon as the capsule is cut. This happens especially when the assistant unguardedly presses on the eye with the finger with which he raises the eyelid, or when the operator does the same with the finger which is employed in drawing down the under eye-lid. All the instruments commonly in use for fixing the eye, even Pamart's spear itself, press too much upon the eye, and are therefore very apt to occasion this accident. Hence we see how necessary it is to employ them as seldom as possible.

It sometimes happens, that in spite of all the caution that can be taken, both by the operator and his assistants, the lens suddenly starts out of the eye. In this case I am apt to believe that the fault lies in the muscles of the eye. It seems probable that the internal irritation, namely, the fear and terror into which the patient is thrown, together with
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the external one produced by the knife, occasion a convulsive contraction of the muscles of the eye, by which the globe is suddenly compressed and drawn back. At least, this much is certain, that the sudden ejection of the lens is always to be more dreaded in those who are of a fearful and irritable habit; and also in those whose eyes have suffered considerably during the operation. I mention this as another motive for using as little freedom as possible with the eye, and to induce the surgeon to avoid every thing that may tend to augment the anxiety and fears of the patient.

In general we shall find, that as soon as we begin our pressure, the inferior edge of the lens rises up, and comes first forward through the pupil. Before doing this, however, it stretches the iris violently, and pushes it forward before it, till having reached the opening in the cornea it fairly forces a portion of it out of the eye.

When we look at the eye immediately after the lens is extracted, we shall find the pupil to appear quite oblong and depressed at its inferior border. Some advise this part to be pushed back with a small scoop; but this is not necessary, for it soon recovers its former shape.

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When the cataract is very soft, the iris suffers but little. I have seen it happen, that as soon as I had opened the capsule containing such cataracts, that they have squirted out, and left the pupil quite clear.

Sometimes the pupil contracts itself most violently immediately upon cutting the cornea. This is a most unhappy accident; for all future attempts to extract the lens are now in general in vain. Pressure on the eye does not effect a dilatation of the pupil; and if we increase the pressure very much, the vitreous humour will be forced out, and leave the lens behind. To me it appears that this accident only happens where the eye has suffered much during the operation; and I am, therefore, inclined to believe that it is always the consequence of a violent stimulus or other injury done to the eye. Mr. Janin thinks it chiefly happens when the lens is of a bony hardness, and ascribes the contraction of the pupil to the pressure and irritation of the lens upon it. That this may in some cases be the cause I do not take upon me to deny, but it is not always so; for in all the cases of this kind which I have met with the cataract was always soft.

Violence is never of any use in such a case as this. It sometimes happens that the pupil, after a short while, dilates of itself, and then we may proceed to open the capsule and to extract the lens; but when this does not happen, I desire the patient to close his eye, and cause a kind of cataplasm made of saffron, camphor, and roasted apples, to be applied to it. In general, from eight to twenty-four hours afterwards the pupil will be found expanded, and then I finish the operation.

There are surgeons who think, that, with some people the pupil is naturally so contracted and small as to render it impossible to force out the cataract without lacerating the iris. They therefore advise us to pay particular attention to the state of the pupil previous to the operation, and in such where that is naturally contracted and small to have recourse to couching rather than to extraction.

I shall take it upon me to assert, that the surgeon may always act in direct contradiction to this rule. It is true, we shall sometimes find people whose pupils seem very much contracted in the shade: but it will also be found that the pupils of these same people are, at
another

another time, open and dilated, even in a pretty strong light. We must, therefore, never trust entirely to the one trial, but repeat it frequently, as the same pupil may, at times, vary much in its state of contraction, although under the same circumstances. I am inclined to believe that this variation in the dilatation of the pupil depends very much on the degree of irritability of the patient, which may be more or less under different circumstances.

We shall sometimes find, however, the pupil uncommonly contracted, and motionless at the same time. This is a circumstance which, if discovered in time, ought to prevent us from undertaking the operation; and yet I have, in spite of this, ventured to do so, and found that the pupil, which appeared to be motionless, dilated itself as I pressed upon the eye, and allowed a free passage to the crystalline lens. I do not assert that this always happens; but the experience which I have had renders me always bold enough to attempt the operation, even under such circumstances. I speak, however, only of such cases where the contraction of the iris seems to be the sole disease; not where it is the effect of an

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amaurosis,

amaurosis, or of an adhesion of the iris, or of any other cause which might tend to destroy all hopes of success from the operation.

As soon as the lens is fairly out of the eye, the window curtain must be drawn up in order that the surgeon may be able to attentively examine whether the pupil is perfectly clear or not. It is a bad practice to close the eye immediately on extracting the lens from the idea of preventing a prolapsus of the vitreous humour, for it frequently happens and especially when the lens is soft, or the capsule not sufficiently opened, that part of it remains behind, which in the suite diminishes, or altogether prevents vision. This particle is not always very easy to be discovered, but often remains concealed in the eye; for which reason it must be most scrupulously examined, at one time with a strong light, at another with a weaker, in order to discover whether any thing remains in any part of the extent of the pupil. The light ought to fall obliquely, or from one side, into the eye, in order that the reflection may not prevent the operator from discovering any of the fragments.

That which generally remains is either a
white

white opaque slime, or a piece of the cataract. This slime is, perhaps, nothing else than the Liquor Morgagni, which has become thick and inspissated. At other times it seems to arise from the lens itself, which is now and then wholly converted into a milky fluid, part of which may easily remain in the capsule. The cheesy kind of cataract is more liable to leave fragments behind it than any other. These fragments are generally to be found at the upper part of the pupil, seldom in the lower, and still more seldom in the middle part. When they are very small, and seated high up in the capsule, they are not very easy to be discovered, especially if the pupil be small. The surgeon supposes the pupil to be quite free and clear, and accordingly binds the eye down. After a few days a little piece sinks down into the center of the eye and becomes visible, but it is then impossible to be extracted.

I once had a case exactly of this kind. I thought I had examined the pupil most carefully, and found it perfectly clear. Eight days after, however, on opening the eye, I discovered a white opaque spot in the center of the pupil, which seemed to be about the size of the head of a pretty large pin. It is

somewhat remarkable, that this occasioned a complete nyctalopia to the patient. In a strong light, when the iris contracted itself very much, he could see nothing; but in a more obscure one, where the pupil dilated itself, he saw pretty distinctly. It seems beyond a doubt that this fragment of the lens had remained concealed behind the upper part of the iris, and had afterwards sunk down; and we must therefore be convinced how necessary it is to examine the state of the pupil with the most scrupulous attention, both in a strong and in a dull light; for what remains concealed behind the iris during its contraction in a strong light, will come into view when it dilates in the dull one.

I have twice seen, that after the lens has come out to all appearance perfectly entire and unbroken, yet there followed immediately after another small opaque body, which, in consistence, resembled the lens itself. What this opaque body was I am really unable to say. It could not be a portion of the lens, for that was hard and quite entire. Is it probable that a part of the liquor morgagni turns hard and condenses?

What remains must be extracted by means
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of Daviel's small scoop^b. This part of the operation is sometimes very troublesome; for it happens that the scoop must be often introduced, and when the eye is restless it is almost impossible to avoid rubbing and pushing against the iris and other internal parts of the eye. It is an unfortunate circumstance when we are obliged to have recourse to it; and hence we see, that although both a hard and soft cataract may be extracted, yet the former is the best to operate upon, since it seldom leaves any fragment behind; and we also see the necessity of opening the capsule as much as possible, because it seldom happens then that any portion shall remain in it.

It is not always necessary, however, to have immediate recourse to Daviel's scoop; for I have often been able to force out the remaining fragment by means of a gentle pressure; and this ought, certainly, to be first attempted; but in doing it we must proceed with the utmost caution, for fear of forcing out any of the vitreous humour.

When the capsule has been sufficiently punctured, we will generally succeed by this means alone.

^b See fig. 1, in the plate.

The scoop ought to be gently bent, but in every point smooth and equal. The iris being dilated by means of a gentle pressure, the scoop may be introduced, and the fragment extracted. All this is sometimes performed with much ease and quickness. At other times, however, and these I suspect to be when the capsule is not sufficiently opened, all our efforts to lay hold of the small remaining portion of lens are in vain. The surgeon moves the scoop up and down in every direction, yet the fragment does not move, nor indeed does the instrument seem to touch it. The eye suffers much from such freedom being used with it, and I would, therefore, advise the operator, where he does not easily accomplish his end, to leave the fragment remaining, rather than hazard the total loss of the eye. Those who cut the capsule sufficiently seldom meet with this difficulty.

It may still be some comfort to those who find themselves obliged to lay aside the use of the scoop, to know that all hopes are not yet lost; for I have often seen this portion gradually disappear of itself. That remnant which I lately mentioned as having occasioned a nyctalopia, disappeared in two months. I
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do not know whether the portion of slime or cataract which obstructed the sight was dissolved and diluted in the aqueous humour, and then absorbed, or if it had transfused, or if it had only sunk down to the lower part of the capsule behind the iris. Be it as it may, the pupil became clear; nor, indeed, is there any thing so very uncommon in this. Does not the milky fluid, which often flows into the anterior chamber of the eye upon couching, disappear very soon? Does not the pus which is formed in the purulent eye often entirely disappear, and even the fragments which remain in the capsule after couching?

If this happens after couching, why ought it not to take place also after extraction? In this case, the capsule being open, the aqueous humour can freely get to the particle, and dissolve it; and this is what generally happens; therefore, when upon examining the eye some time afterwards, we find that the little piece is not exactly in the same part that we last observed it to be in, and that the moving the eye makes it tremble, there is grounds to think that it will in time sink down behind the lower part of the iris, and leave the pupil clear. If we discover that it
gradually

gradually diminishes in size, and at the same time becomes transparent, we may hope that it will be altogether dissolved.

External, discutient, and emollient applications, such as borax, and a decoction of altheæ, probably assist and promote this wished-for change; the first, perhaps, by giving a solvent power to the aqueous humour, the other by widening the opening in the cornea, and by increasing the transudation of the opaque particle which may have been diffused in the aqueous humour.

In two cases which fell under my care, the remaining fragments occasioned a singular appearance, which at first terrified both me and my patient. The operation was successfully performed, the lens seemed to come out entire, and the pupil remained clear. Upon opening the eye the twelfth day after the operation, I was surprized to find it perfectly white. The patient was quite blind. At first I imagined that the cornea itself had become opaque, but I soon discovered that the fault lay in the aqueous humour alone, which seemed thick and white. In the course of a fortnight, however, this muddiness disappeared, and the patient recovered his sight.

This was, beyond a doubt, occasioned by a small remnant of the lens being dissolved in the aqueous humour, and tinging it.

Although I thus assert that the remains of a cataract often disappear with time, I do not mean to dissuade surgeons from using Daviel's scoop. On the contrary, I advise it as the more sure means, and that we should only trust to the uncertain chance of the fragments disappearing in cases of necessity,

On the surface of two lenses, which I extracted, were to be discovered many black lines, which gave it a star-like appearance. Did these come from the pigmentum nigrum, or not? The operation itself was easy and successful.

C H A P. VI.

On the Concreted Cataract.

IF the patient be unable to distinguish light from darkness, if the cataract appears to be in immediate contact with the iris, and the pupil entirely, or almost entirely without motion, then do we judge that there is a very strong concretion between it and the iris. In this case, the success of the operation is very doubtful indeed; but if the patient be still able to distinguish in any degree, light from shade, if the iris still retains a little motion, although irregular, and if it seems to become oblique, curled; or in folds as to its figure, the adhesion to the iris is not so strong but that the operation may be attempted with some hopes of good success. But we must never forget, under such circumstances, to warn the patient of the nature of his case; and as the eye always suffers much from the action of separating the lens from the iris, we must use every possible previous precaution,

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in order to prevent the subsequent inflammation from running too far.

If, after having cut the cornea, punctured the capsule, and pressed gently upon the eye, we do not observe that the cataract moves ; and, if nothing was discovered previous to the operation which should have led us to suspect that something of this kind might happen, then there is ground for supposing that an adhesion has taken place. This is a species of the concreted cataract which is not easily discovered before hand.

The surgeon will deceive himself exceedingly if he expects to obtain his end in this case by encreasing the pressure on the eye : during some time the cataract may remain quite motionless, but at last it springs suddenly forward, together with its capsule, and accompanied with the whole or greatest part of the vitreous humour ; nay, it often happens under such a practice, that the whole of the vitreous humour alone shall flow out, leaving the lens and capsule behind.

Different instruments have been contrived, in order to affect a separation of the cataract from its adhesions.

Mr. Sigwart introduces a double-edged
couching

couching needle through the pupil, and between the iris and cataract; and with this he endeavours to loosen the connection all around. But how is it possible to introduce a sharp pointed instrument between two parts which mutually adhere, without wounding both of them? How is it possible to separate the whole surface of the lens from the iris with an instrument which is quite straight? It may be possible to make it pass between them in the upper part of the eye, but it will be found impracticable in the under; and what is there to be done if the adhesion be chiefly at the inferior part?

The instrument I generally make use of is a flat probe, pretty much bent at one end. This I introduce between the lens and iris, and endeavour to move it gradually around its axis, sometimes gently pressing on the cataract, in order to push it a little back, and promote the separation.

Where the concretion is not very strong this method generally succeeds. It must be confessed, however, that in doing this the iris always suffers much, and therefore we ought to use every possible precaution, in order to prevent an excess of inflammation; at the same time

time the surgeon, by proceeding very cautiously, may obviate the bad effects in a great degree, and still obtain his end. All depends, in general, on the degree of adhesion which has taken place. The more points of union there are, and the more firmly these are connected, the more difficult will the separation be. If the iris and lens be completely connected the case is incurable. It may moreover be remarked, that in the case of a curable concretion, the capsule, by means of which the lens adheres to the iris, is generally somewhat opaque, and on that account, as soon as the separation is completed, it must be well cut and opened by means of the cystitome.

The concretion of the lens with the capsule is not capable of being disunited; for how is it possible to bring any instrument into the capsule which can separate both the anterior and posterior surface? All that can be done, in order to restore the patient to his sight, is to extract both lens and capsule. It may be asked by some, is this always possible? Both my own experience, and that of others, convince me that it is not only possible, but sometimes very easy.

In two cases, where I performed this operation,

ration, the lenses came out unexpectedly enveloped in their capsules, without any bad symptoms following.

Mr. Janin has proved by many and repeated experiments, that the capsule of the lens is not a continuation of the membrane enveloping the vitreous humour, but that it is quite distinct, and can be easily separated from the capsule of the vitreous humour, and from the ciliary processes, by means of blunt instruments only : nor after its separation does it show any laceration, or any other mark by which one might be led to conceive that it had firmly adhered to the *membrana hyaloidea*^c.

But in what manner are we to proceed in order to loosen and extract both lens and capsule. I have often made use of the following process, which is the same with that which Mr. Warner^d employs in couching a concreted cataract, with good success.

I introduce the point of a round couching needle through the pupil, and push it into

^c See his *Memoires et Observations sur l'Œil*, à Paris, 1772, p. 137; and also Richter's *Biblioth.* v. 2. part I. p. 100.

^d See his excellent work, entitled *Cases in Surgery*, 1760, p. 62.

the center of the lens. I then move the lens gently by means of this instrument in every direction. When I think I have by these gentle movements loosened the adhesions of the capsule, I twirl the needle round between my fingers, in order to disengage it, and then withdraw it altogether. By this means I am generally enabled to extract the cataract with the assistance of a slight pressure. If it does not seem inclined to come easily out, I repeat the same manœuvre; but if, after having repeated it again and again, the cataract does not move, even although a pretty strong pressure should have been applied, I would advise the operator to desist altogether from his attempt. It is more than probable that every future one will also be in vain, and that the repeated irritation may prove the cause of the total loss of the eye.

It might, perhaps, be better to use rather a double-edged than a round needle; for with such one we can move the lens not only upwards and downwards, and from side to side, but we can make it turn round its axis; a motion which might contribute more than all the others to disengage it.

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It will probably strike some as a dangerous attempt to introduce a sharp-pointed instrument into the posterior chamber of the eye. Great caution, indeed, is necessary in doing so; but all dangers may be easily avoided by using a canula to sheath the point of the needle whilst introducing it. As soon as it has arrived at the capsule the needle may be pushed forward, and the canula withdrawn.

C H A P. VII.

On the Prolapsus of the Vitreous Humour.

THIS takes place under a variety of circumstances; the vitreous humour sometimes flows out whilst the lens remains behind, or the lens comes out and immediately after follows the vitreous humour, or the vitreous humour begins only to flow some hours, nay days, after the operation.

There are many surgeons who dread this accident very much; and we have in consequence many proposals offered to us, by which it is to be prevented. Mr. Sharp recommends to us to cause the patient to shut his eye the moment the lens is extracted. Mr. Poyet orders the patient to lie on his back during the whole of the operation. But should there be any cause which tends to force out this humour, it will escape in spite of this situation, even although the eye-lids be kept shut. It is other circumstances entirely which we must attend to, if we mean to prevent the discharge of this fluid.

I confess that I have seen this accident happen but very seldom during the operation; and when it does so, there is always some particular cause for it. Either the assistant who supports the eye-lid presses unguardedly on the eye itself, or the operator performs his part so awkwardly, that the eye is violently irritated and injured, or he makes use of a bad method of operating, or his instruments are ill adapted for the intended purposes, or he persists in his endeavours to force out the lens although he has made the incision in the cornea too small, or he presses hard on the eye without having previously punctured the capsule.

These are circumstances which the operator must avoid if he means to prevent the discharge of the vitreous humour.

I myself have operated on some to whom this accident happened during the time of the operation; and the circumstances are so remarkable as to excuse my shortly narrating them. The eyes of the first patient were very hollow and profound. The incision was rather too small, but still not so much so as to deprive me of the hopes of being able to extract the cataract. Upon pressing the eye
gently

gently the lens absolutely came forward and sunk into the wound of the cornea; there it remained fixed, with about the half hanging out of the wound. I attempted to disengage it by means of Daviel's scoop, but it broke in two. The upper half sprang immediately back to the posterior chamber, whilst the other dropt down on the cheek. I thought I should be able to force the remaining half out by pressing on the eye, but I was deceived in my conjectures; for as often as I pressed on the eye, as often did a portion of the vitreous humour come out, the cataract remaining stationary.

In another case, in which the incision in the cornea and capsule were both sufficiently large, the pupil dilated itself, and the cataract seemed inclined to come through it; but although the pupil was thus dilated, and that the lens projected considerably forward, still it never came completely out. Upon this I increased the pressure, until at last the cataract sprang suddenly out, and at least a third of the vitreous humour with it. No bad consequences ensued. The patient recovered his sight. This cataract was very big, round, and resembled a

sack full of a whitish fluid. I have already taken notice of it.

Sometimes the vitreous humour is very thin, and as if dissolved. In such a case, it is extremely apt to run out upon the most gentle pressure, and without any fault of the operator. What leads me to suspect this, was what happened to me in the case of a lady, who, in order to relieve herself from the dimness of sight, had long applied external discutient remedies, and especially the volatile alkali. The operation was well performed, and the cataract came out with a very gentle pressure; but yet there immediately followed a portion of the vitreous humour, which appeared uncommonly thin, and as if dissolved*.

A discharge

* Professor Bart, in a conversation I had with him, also mentioned this state of the vitreous humour as what he had met with more than once in his practice; but he looks upon it as one of the most unfortunate circumstances which could possibly happen, either to the patient or operator. Where the vitreous humour is in this dissolved kind of state, it is almost impossible to succeed with the operation, for even the most gentle pressure, he says, is sufficient to make it ouze out from above the lens; and if the pressure be continued, the whole of that humour will be discharged before the lens can be made to move. Dr. Bart has generally observed, that when the vitreous humour is thus diseased

A discharge of the vitreous humour, therefore, during the operation, is a rare occurrence, and never happens without some very particular cause; but this accident happens more frequently sooner or later after the operation. The cause is various. The most frequent appears to be a convulsive contraction of the muscles of the eye, by which it is compressed.

It frequently happens that the patient begins to complain soon after the operation, of his eye moving violently and involuntarily under the bandage. This is evidently a convulsive motion, and a consequence of the irritation which the eye suffered during the operation. I think I have observed that this discharge of the vitreous humour happens more frequently to those who are possessed of great sensibility of nerves, and are subject to cramps; and also to those who have been seized with great dread or terror, either previous to or during the operation, and who suffered much from

diseased, it acquires a brownish colour. If, therefore, after having made the incision in the cornea, and punctured the capsule, he observes even the smallest drop of a thin brownish fluid ouze out from behind the lens, and that with a very moderate pressure, he immediately desists from the operation, by which the form of the eye is at least preserved to the patient.—The T.

convulsive affections after it, such as a sense of tightness and contraction in the extremities, vomiting, colic pains, trembling, and anxiety, than to those of an opposite disposition.

It must, therefore, surely occur to every one, how imprudent that surgeon acts, who, either by his conduct, or by useless and tedious preparations, or by unnecessary and pompous discourses, tends to augment the patient's fears; who, in order to demonstrate his intrepidity, speaks and acts with wanton roughness, and who, in order to convince those who listen to him of his own dexterity, relates the most awful stories of the wonderful and frightful cases which he has cured. Such a conduct only tends to terrify and distress the patient by augmenting his fears. Let the uneasiness and anxiety of the patient be soothed and quieted by a friendly and cheerful conversation, and when speaking of the operation, let it be mentioned as a thing of little consequence; but above all, let the surgeon perform his part with quickness, and without any useless parade. These are rules which a surgeon ought most strictly to observe, not only in this, but in every other

other operation. More of this, however, afterwards.

We see, moreover, how necessary it is to make use of emollient and sedative remedies, both externally and internally, immediately after the operation. By these means we not only prevent a discharge of the vitreous humour, but also counteract the other bad consequences of the operation.

Immediately after the operation, I lay a cataplasm of apples, saffron, and camphor, on the eye.

There are other causes which occasion this late discharge of the vitreous humour. One of the most frequent is the tightness and pressure of the bandage. As the cornea is the most prominent part of the eye, every external pressure must principally affect it. Indeed, every external injury, whether it be pressure or a blow, may occasion a discharge of the vitreous humour. We are never secure against this accident, till after the fourth or fifth day. The wound, it is true, appears to be closed before this time, but it can be easily forced open, and the humour discharged. I have seen it happen on the fourth day, in consequence of violently forcing asunder the eye-lids,

eye-lids, which adhered strongly together, in order to examine the eye. The patient, who, until then, had experienced little or no pain, immediately complained of it, and, indeed, so much so, as to induce me to examine the state of the eye. I found the inferior portion of the wound open, and part of the vitreous humour, of the bulk of a pea, hanging out of it. Two or three hours before there was nothing of this kind to be discovered. We, therefore, see how necessary it is to delay the opening of the eye till the tenth day.

Among the many causes which are apt to promote this prolapsus of the vitreous humour, may be reckoned violent terror. A peasant, from whom I had extracted the cataract, was so perfectly free from every bad symptom during the first four days after the operation, that there was but little doubt of a complete cure. A violent fire, however, unfortunately broke out in a house adjacent to that of the patient's, on the morning of the fifth day. The patient was much terrified, and frightened by this accident, and soon after felt a most acute pain in his eye. Upon opening the eye, I discovered a prolapsus of the vitreous humour, which, if we can trust
to

to the sensations of the patient, was not there before, and which was certainly occasioned by the fright ; for he assured me, that he had received no blow, nor any external injury on the eye.

It may happen, that the patient shall unguardedly hurt his eye in the night, especially when asleep ; on which account I always cause an attendant to watch the patient during the three first nights, and forbid him from turning on that side which has been operated on.

It is seldom that we can discover whether there is a prolapsus of the vitreous humour or not until about the tenth day, when we open the eye. If we are watchful, however, and attentive, there are now and then certain symptoms which may lead us to suspect such an accident even before that time. If, for instance, the aqueous humour, which generally ceases to flow out of the eye about the second day, should begin to flow afresh about the third or fourth, it is to be suspected that the wound has been forced open, and probably some of the vitreous humour, or even part of the iris, forced out. This conjecture will be rendered more probable if we discover any
sufficient

sufficient cause for such an accident, or if the patient begins to complain suddenly of a violent and acute pain.

When the aqueous humour does not cease to flow on the third day after the operation, but continues to do so until the fifth or sixth, we may be assured that there is something opposing itself to the closing of the wound in the cornea, and that it probably is, either the iris or part of the vitreous humour which has been prolapsed.

Still it must be confessed, that as these circumstances do not always happen, as I have just now related, nor are always easy to be discovered, the prolapsus of the vitreous humour is seldom found out before the twelfth day when we open the eye; and upon doing this we generally discover the eye to have the following appearances :

The wound in the cornea is commonly entirely closed, except at the lower part, where it remains open, much distended, and filled with the vitreous humour. This rests immediately upon the conjunctiva, and resembles a white opake jelly hanging by a slender stalk, which seems to be squeezed and compressed by the wound. The whole of this portion may be
very

very easily separated by cutting through the stem. I never do this however, partly because the patient is apt to be afraid, and think that he has to undergo a second operation; besides it is better not to let him know that any such accident has happened, and it is also quite unnecessary; for the prolapsed part does not hurt the eye in the smallest degree, and the wound as it closes gradually compresses this slender portion like a ligature, until it entirely separates the portion which hangs out. All this sometimes takes place so quickly, that we find the portion of vitreous humour already quite separated by the twelfth day. Sometimes it is not only separated by the twelfth day, but also washed out of the eye by the tears, so that it is almost impossible to know that such an accident had taken place.

That part of the wound which was kept open by the prolapsed portion of the vitreous humour generally remains, for some length of time, white, thick, and irregular; but this disappears sooner or later; nay, it has happened often, to my great astonishment, that after a certain time not the smallest vestige of a cicatrix was to be seen remaining.

Whilst

Whilst the vitreous humour remains in its prolapsed state, it alters the figure of the iris, by drawing the under part of it downwards and forwards ; but this also disappears as soon as the wound is healed. I shall again speak of this in the following chapter.

We are, therefore, of opinion, that when a prolapsus of the vitreous humour remains undiscovered till the tenth or twelfth day, it becomes unnecessary to cut or separate it. Suppose, however, that this accident was discovered immediately, or that it happened during the operation, what is then to be done ? Let the prolapsed part be cut off, says Daviel. I have often attempted to do this, but never have been able to succeed ; and I am now resolved never to attempt it again. It is so very difficult in such cases to separate this portion of the vitreous humour, that I am almost tempted to believe that Daviel never has followed the rule which he himself has laid down. I speak principally of that case where part of the vitreous humour has been forced out alongst with the cataract. In order to prevent a too great loss of this humour, there is no better remedy which we can at the instant employ, than to shut the eyelids. As soon as we open them, in order to

separate the prolapsed part, a fresh portion flows out; and this happens as often as we open the eye, so that we are soon forced to desist from any further trials of this kind. There may be, perhaps, cases where this does not take place, but from what I myself have seen I must think that it does so in most.

I confess that I have seen cases where this did not take place, but even in them it will seldom happen that we can separate the prolapsed portion according to our wishes; for in attempting to lay hold of the portion with the scissars, and to separate it, a fresh portion is pulled out of the eye, and the mischief encreased. But, after all, it may be asked, why cut away this portion? what advantages are to be gained by doing so? I answer, none. The prolapsed part does not squeeze nor molest the eye, and may, therefore, remain hanging out. If, by cutting it away, we suppose that we remove an obstacle to the healing of the wound, I answer, that the portion which lies in the wound itself, and which prevents its closing, cannot be separated; and that the other portion which we cut away is without the wound, and does it no injury.

It is not only difficult to separate this portion

tion of the vitreous humour, but also quite unnecessary. The wound in the cornea, as it gradually diminishes in size, acts like a ligature upon it, and at last entirely separates it. As soon, therefore, as I discover any part of the vitreous humour to be prolapsed, I immediately shut the eye-lids without cutting it away, and apply a bandage upon the eye.

I am convinced that in such a case the surgeon can do little else than to entrust all the rest to nature.

Upon opening the eye the twelfth or fourteenth day after the operation, it is seldom that I find the smallest mark of a prolapsus of the vitreous humour. I could here relate several cases of this kind.

The loss of a small portion of this humour seldom brings on any bad consequences *. The man, whose case I related above, as having a cataract which resembled a small sack, lost at least one-third of the vitreous humour, and yet recovered his sight so entirely, that he could distinguish with his naked eye a small spot

* Professor Bart has observed, that the inflammation subsequent to the operation, is always much greater in those patients who loose part of the vitreous humour, than what commonly happens to those who have suffered no such accident.

upon a diamond. The eye, also, was of the same size with the other; from which we may conclude that a small portion of this humour may be repaired when lost.

When the prolapsed portion is considerable; it is in general pretty long before the patient can open, or use his eye. In the case hinted at, above five weeks from the time of the operation elapsed before the person could open it; from which, and from several other similar cases, I am led to think, that little is to be dreaded from this accident. At the same time it is evident, that where a great part of this humour is discharged, there not only follows a diminution, but, in general, a total loss of sight.

I have remarked; and others have done so also, that those patients who only lose a small or moderate share of the vitreous humour, generally acquire a much sharper sight than those who have lost none of it. This singular circumstance may, perhaps, be accounted for in the following way. When a part of the vitreous humour is discharged, so much is resecreted as to fill not only the space which was emptied, but also the posterior chamber; or the place formerly occupied by the crystal-

line lens. And as the consistence of this humour approaches nearer to the density of the lens than the aqueous one, it consequently repairs its loss better: whereas, in those who have not lost any part of the vitreous humour, the aqueous humour fills both the anterior chamber and the space formerly occupied by the lens. And as there is a vast difference between the density of these two parts, the loss of the lens is but badly repaired.

This may probably account for the observation, that those who are couched generally see rather better than those who have the cataract extracted; for, perhaps, after couching, the vitreous humour occupies the place of the lens, which, after extraction is filled up by the aqueous one. This advantage couching certainly has over extraction; but it is not a very great one; for the acuteness of sight which the former possess, in comparison with the latter, is not so material as to render the use of spectacles unnecessary to them. Whether the patients be cured by extraction or couching, still they must equally make use of glasses; and the surgeon ought always to inform his patient of this; for there are some who expect to regain the same acuteness

of vision which they formerly had, and who are surpris'd and mortified after the operation, on finding that they cannot do without them. Very few, indeed, are so fortunate after the operation as to be able to read without their assistance.

C H A P. VIII.

On Wounds of the Iris.

IT is generally believed that the iris is very easily lacerated in this operation, and that all lacerations, and other wounds of that membrane, are dangerous.

If the operator pays strict attention to all the rules which I have laid down, and particularly if he takes care that the aqueous humour be not discharged before the incision in the cornea is finished, he will run but little risk of wounding the iris. It is not to be denied, however, that there are cases where it is impossible for the most dexterous sur-

geon to avoid cutting that membrane ; for in some it advances so much forward during the operation, that it is impossible to make the point of the knife avoid it ; nay, it now and then happens, that as soon as the incision is begun the iris approaches so close to the cornea as to make it impossible for the surgeon to avoid pushing the point of the instrument into the pupil.

This accident is only prevented by avoiding all irritation previous to and during the operation, and by performing it in the most cautious and guarded manner. The more irritation the eye suffers, the more is the iris pushed forward, and the greater is the danger of injuring it. The same effect is produced by entering the knife too near to the sclerotic coat. But I have already spoken of this.

But are wounds of the iris in reality so dangerous as they have been represented by some ? I have often seen this membrane wounded, and yet no bad effect ensue ; nay, I have once seen it very much lacerated, and there did not even succeed an inflammation. As this case is really singular, I shall shortly relate it.

The patient was a lady who had very hollow

low deep eyes. The knife went gently and easily forward till it reached the middle of the anterior chamber; but, on my endeavouring to push it forward, the eye at once turned so much inward as to conceal the half of the lucid cornea. I intreated the patient to turn her eye outward, but in vain; she could not move it; and on my again requesting her to do so, she turned it so quickly outward, that I could not prevent the point of the knife from piercing through the inferior part of the iris into the eye. I drew the knife a little back, and as the eye was now in a good position, I finished the operation.

The experience of many confirm this opinion, that wounds of the iris are not so very dangerous as some seem inclined to think.

That celebrated and dexterous oculist, Mr. Daviel, assures us, that he has often lacerated the iris without any bad consequences, and does not hesitate to cut the iris when it seems to obstruct the passage of the cataract. He shows, by many examples, that this may be done without risk or danger^c *.

In

^c See his *Thes. An cataractæ tutior extractio forficum ope?*

* This is a piece of practice which Professor Bart not only

In the operation of couching, do we not puncture the choroid coat without producing any bad consequences? Why, therefore, should a wound of the iris be so dangerous*?

However

follows, but strenuously recommends, where the lens is very large, and where the iris, by not easily and readily dilating itself, seems to prevent the exit of that body. In such a case, he cuts this muscle at one side with a pair of small bent scissars; for he is convinced from experience, that the iris suffers much less real injury from a simple wound, than by the pressure and over distention which its fibres would otherwise suffer, were such a large lens to be forced through the natural opening of the pupil. I myself have seen this able and intelligent oculist perform this in two or three cases, and no bad consequence ever ensued in any one of them.—T.

* Such a question was hardly to be expected from the celebrated author; for although the iris appears from dissection to be a real continuation of the tunica choroidea, yet, from the time it leaves the ciliary circle, its modification and sensible qualities become quite distinct. As iris, it resembles a muscle possessed of sensibility and irritability to an extreme degree: as choroid coat, it appears only a vascular and sensible membrane. So apparent a difference in structure and modification between two parts ought not only to forbid the physiologist from reasoning by analogy concerning the functions of the one from those of the other, but also prevent the medical practitioner from drawing any practical conclusions concerning the action of morbid causes on the one, from the effects which they seem to produce on the other. Convinced by anatomy alone, that the membranes lining the mouth were a real continuation of the external membranes of the body, one might as well suppose, that what produced but a slight inflammation on the skin would
produce

However much I may be convinced that small wounds of the iris are not much to be dreaded, still I believe that great ones are followed with bad consequences; such as violent inflammation, a contraction of the pupil, &c.

Mr. Janin believes that all wounds of the iris, which run parallel to the radiated fibres, close; and that those which cut these fibres transversely never close, but form a second pupil, which dilates in a strong light, and closes in the dark; for, as its motions are regulated by those of the natural pupil, it must contract whilst the other dilates, and dilate whilst the other contracts.

I really am uncertain whether all this takes place as just described; but I can take it upon me to say, that I have seen the iris wounded in not a few instances, and yet never saw an artificial pupil produced; and I cannot conceive that the wound, in all the cases, should have been parallel to the radiated fibres.

produce only the same degree in the membrane lining the mouth, as to suppose that what affected but little inflammation in the choroid coat, would affect nearly or just the same in the iris.—T.

It is not uncommon for the pupil to lose its natural round figure after the operation, and to become angular, oblique, or oblong. Experience teaches us that this fault does not in the least injure vision, and that it often gradually disappears with time. In general, it is the consequence of a prolapsus of the iris. It is impossible for this membrane to be protruded without altering the shape and situation of the pupil. A prolapsus of the vitreous humour is also another principal cause of this.

When, after the cornea and capsule being cut, the lens is forced suddenly out, and consequently the iris suddenly stretched and dilated, a fault of the kind we are speaking of very often remains.

I have seen several, the figure of whose pupil was altered after the operation, and who yet saw very well, except one woman, whose pupil was oblique, and who asserted that every object appeared in the same direction. In what this woman said, however, I put, but little confidence, as she was much given to drink; besides, it is not easy to conceive how the obliquity of the pupil should cause an obliquity in vision. Let this be as it may, the
most

most cases prove that a change of figure in the pupil seldom produces any bad effects. This, it must be confessed, is only true with regard to those where the alteration of the figure of the pupil is but moderate: where it is in a great degree, there is generally a contraction of the pupil, and consequently a diminution of sight. I have, however, observed in some cases, that this fault has, in the course of time, entirely disappeared, or at least has been very much diminished. The rays of light, by irritating the iris, make it alternately contract and dilate, and thus gradually resume its former figure, except there exists some particular cause to prevent it.

A particular circumstance of this kind is the prolapsus of the iris. This is always accompanied with a change in the figure of the pupil, and prevents the pupil from recovering its former shape as long as it exists.

I have never observed that the iris has been prolapsed during the operation; but I have seen several instances where this happened some hours or days afterwards.

Mr. Daviel asserts, that when, after having finished the incision in the cornea, the knife is suddenly withdrawn, all the aqueous humour

mour at once flows out, and often a portion of the iris after it. I myself have never seen this happen, and I know of no one else who has ; at the same time it is the most prudent practice to withdraw the knife slowly after having finished the incision. It is, indeed, not to be doubted that a great pressure on the eye, or a strong irritation, of whatever kind it may be, acting during the operation, may occasion a prolapsus of the vitreous humour, and that, on this account, all instruments which violently press and irritate the eye, of which kind are principally those intended to fix that organ, ought to be avoided.

The inferior part of the iris always suffers so much during the operation, and at the same time seems as it were forced to prolapse, that we really cannot help being astonished that it does not happen more frequently. As soon as the cornea and capsule are cut, and that we begin our pressure on the eye, the inferior edge of the lens rises up, and presses so strongly upon the inferior part of the iris, that it is sometimes forced quite through the wound. At this time there is a real prolapsus of that membrane ; but as soon as the inferior margin of the lens has passed the pupil,
and

and begins to slip through the wound 'in the cornea, the iris glides back again. Such a distention of this membrane must necessarily induce a relaxation of its fibres, and render it liable to a prolapse.

The causes which induce a later prolapsus of the iris are various. Whatever tends to effect a prolapsus of the vitreous humour, may also effect one of the iris; and a prolapsus of the vitreous humour itself is often the immediate cause of a prolapsus of this membrane; for the vitreous humour' cannot easily flow out without dragging the iris alongst with it.

The most frequent cause of this accident is a convulsive contraction of the muscles of the eye, occasioned either by the uncommon irritability of the patient, or by performing the operation in an awkward and bungling way. I have remarked, that it occurs most frequently in pale, weak, irritable, and timorous people, and that it is chiefly to be dreaded when either the whole body or the eye is affected with cramps after the operation. Any thing that presses hard on the eye, such as, perhaps, the hand of the operator or assistant, or the bandage, &c, are liable to produce this accident.

I have

I have already remarked, that the iris is readily prolapsed where the incision has been carried too near the sclerotic coat, or, as Mr. Daviel remarks, where two-thirds of the cornea have been cut.

Mr. Daviel recommends the returning the iris immediately, by means of a small probe. This may be accomplished where the prolapsus has happened immediately after the operation; but as it seldom takes place for some days afterwards, it is not often discovered before the tenth day when we open the eye, and then the iris will be found to adhere to the wound, or the wound has contracted itself so close about the prolapsed portion, that it becomes impossible to push it back. At this time the eye generally exhibits the following appearances: the pupil is long, and seems applied to the cornea at the inferior part of the anterior chamber. The lower portion of the iris seems to be formed into a plate, which hangs out of the wound; at other times it lies pretty equally in the wound, and does not project beyond it.

At first, this prolapsed portion is quite soft and pulpy, but after some time it turns harder. The lips of the wound surrounding it

it are tumid, and pout out. The rest of the wound is completely healed, and the anterior chamber generally full of aqueous humour.

The prolapsus of the iris is sometimes, and chiefly on its first occurring, attended with the most acute pain, which, however, gradually diminishes, and at last altogether disappears, although the iris be not returned; nay, I have seen cases of a prolapsed iris, which never were accompanied with pain, either at the beginning of the accident or afterwards. I mention this circumstance in order to contradict the assertion of Mr. Guenz, who, in his *Diss. de Staphylomate*, Lips. 1748, § 4, says, that the prolapsus of the iris is always accompanied with violent pain at the beginning. This is, most assuredly, not always the case, and the pain which arises at the beginning generally diminishes in the course of time.

At first, the prolapsed part of the iris is so exquisitely sensible, that it becomes impossible to touch it without exciting the most acute pain; nay, the very motion and pressure of the eye-lids upon it are painful; but this in general grows gradually less and less, and often totally subsides. I have, in some cases,

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touched

touched the prolapsed part of the iris pretty roughly with a probe, without the patient's being sensible of it.

If I do not happen to discover that the iris is prolapsed before it be so late, that it is impossible to return it by means of the probe, I generally pursue the following method. I generally tie down both eyes of the patient, in order to prevent much motion, and in the hopes that the gentle pressure of the eye-lids may promote the return of the iris. All motion of the eye is in general painful, as it occasions more or less friction on the prolapsed iris. This, therefore, must be guarded against.

The pressure of the eye-lids really contributes towards the return of the iris, especially if the patient is told to increase it by squeezing them gently together.

The external air appears to me to be what chiefly alters the state of the iris; it dries it, and by so doing renders its return more difficult, which is another reason for tying the eyes down.

Every thing which excites convulsive motions of the eye, or presses upon that organ, or increases the flow of blood and humours
towards

towards it, are apt to promote and augment a prolapsus of this part. To this class of causes may be reckoned every violent motion of the eye, sneezing, coughing, vomiting, &c.

Some cause the patient to lye always on his back; but I doubt whether this contributes much towards the cure.

I generally wet the prolapsed part with a solution of alum, by means of a small hair brush; and as soon as the inflammation is gone, or much diminished, I cause a strong light to be thrown suddenly upon the eyes several times a day; which, as it occasions a sudden and violent contraction of the iris, tends to draw back the prolapsed portion.

By these gentle means I have often succeeded, and have seen the iris completely restored to its natural situation in about three weeks or a month. The pupil also had regained its former figure, and the wound closed.

It is but seldom, however, that the operator succeeds so completely as this. The prolapsed part of the iris, it is true, is often made to return by assiduously employing the means we have been speaking of; but in most cases it remains during the life of the patient, adhering

adhering to the inner surface of the cornea, and disfiguring the pupil. I take it upon me, however, to say, that I know many patients who see very well in spite of this circumstance. Not only the irregularity of the pupil, but the adhesion diminish, very much with time. I have been surprized at the change that has taken place in the course of a few months only.

Some will, perhaps, doubt that the prolapsed iris can be made to return by so gentle means, after having remained so long in the wound; but experience proves that it is perfectly possible. And are there not other cases in surgery where a similar effect is produced by a similar cause? Is not a concreted hernia often made to return by the constant pressure of a bandage, and by causing the patient to lay for a great length of time on his back?

I know there are some who recommend a more expeditious method, and propose to enlarge the wound of the cornea, and, after separating the adhesions of the iris by means of a small knife, return it into the anterior chamber. I do not pretend to reject the proposition, but I am afraid it is one which has been devised and practised in the study
only;

only ; at least, I have, in two cases endeavoured, but in vain, to carry it into practice, and I am much afraid it never can be done without lacerating the iris very much.

Suppose, however, that we find it impossible to attain the end in view by the means I have proposed, what remains to be done ? Shall we cut away the projecting part of the iris, or shall we apply a ligature around it ? Mr. Guenz dissuades us strongly against both, and predicts the worst consequence from the practice of any of them. I confess that I have never employed any of these means ; but if the prolapsed part of the iris was hard, dry, insensible, and so large as to render the motions of the eye-lids inconvenient or painful, I would, perhaps, cut it away. I would never, however, apply a ligature around it. When the part is very small, and produces no kind of inconvenience to the patient, it is not necessary to think of an operation ; and if the part be sensible, bad consequences are, perhaps, to be expected. It is at the same time worth remarking that nothing is gained by this operation but freeing the patient from the pressure and irritation of this small projecting part. The

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adhesion

adhesion and irregularity of the pupil remain the same.

Before proceeding, however, to this operation, I would always first try the remedy which has been lately mentioned by Mr. Janin; I mean the butter of antimony. He touches the prolapsed part, he says, with a little of this once a day, or once in the two days. In general the staphyloma disappears so quickly that it is not necessary to touch it more than twice or thrice.

The butter of antimony does not act as a caustic, but as a stimulating remedy. It does not create an eschar; and besides, very little of it is applied, and that little so soon washed by the tears that it cannot act like a caustic. Immediately after each application of this remedy, the eye must be bathed in milk, which allays the pain very much. Perhaps a slight solution of the lapis infernalis might act in the same manner, and with the same effect.

This evil is, indeed, much sooner and more easily corrected when early discovered; for we can then easily return the prolapsed iris. The prolapsus that takes place at a later period may be sometimes discovered, and that even without opening the eyes, by attending

tending to the symptoms which I have related in the preceding chapter. As soon, therefore, as any of these symptoms begin to appear, the surgeon should open the eyes, and remedy the evil as soon as possible.

Upon examining the eye immediately after the extraction of the lens, we shall find that the lower part of the iris is sunk down to the wound in the cornea, and that the pupil is consequently of an oblong appearance, for as the lens passes through the pupil to the wound it generally carries the lower part of the iris with it.

Mr. Daviel advises us to replace this immediately by means of the small scoop; for my part I never do this, as I have observed that the iris generally resumes its wonted place and figure in a few minutes after.

It is falsely credited by some, that the iris loses its mobility after the operation of extraction. It is true, that when the lens passes with rapidity through the pupil, the iris is suddenly stretched and dilated, and generally loses its power of contraction and dilatation; but this quick overstretching of the iris is generally to be considered as a fault arising either from a want of caution in the

furgeon, or from his being impatient, and in too great a hurry. It is seldom to be dreaded where the operator handles the eye cautiously, and increases his pressure on it gently and gradually; and this he ought especially to do where the lens is large. The iris will bear a very great distention, if gradual, without being deprived of its mobility, much more readily than a smaller one that is sudden. The immobility of the iris after the operation is generally, I will not say always, owing to some fault of the operator.

This immobility seldom produces any very great inconvenience if the iris be not either too much contracted, or too much dilated. I know several people who see perfectly well in spite of this defect; and I have seen some, whose iris, after some time, has begun to recover its wonted power of motion. This happy event may, perhaps, be promoted and hastened by various means. A strong aromatic lotion and electricity, that famous remedy which I have so often tried in vain in other cases, have succeeded well in this.

Sometimes the pupil closes altogether after the operation. This accident causes a total blindness, and is, in general the consequence of a violent

a violent inflammation; but, indeed, its cause is not always to be readily ascertained. I once performed this operation on a woman whose pupil was quite open the tenth day after the operation; but on my examining the eye on the fifteenth, it was quite closed, and remained so ever after. I shall relate the history of a similar case at the end of this treatise.

This fault is seldom to be corrected without an operation. The celebrated Cheselden first proposed a method for remedying this; but I must confess that his manner of operating does not deserve approbation. He enters the small knife, with which he is to pierce the iris, through the sclerotic coat, at the distance of one line from the cornea, and having pierced the membranes of the eye at that place, he pushes it from behind forward through the iris. It is not easy to guess, why he did not rather make his knife pass immediately through the lucid cornea into the anterior chamber. In this way we reach the iris much more readily than in the one just described, and besides, we wound nothing but the insensible cornea. Whereas, in the other way, not only all the coats of the eye, but, perhaps,

also the ciliary processes, and even the capsule which contained the lens, are lacerated; besides, as the point of the knife is quite concealed behind the iris, it is impossible to know before hand at what part we are to push it through, and make the opening.

It has been observed, that this new pupil is very apt to close again soon after the operation. Mr. Janin says, that if the incision in the iris be made to run parallel to its radiated fibres, it always closes, but that, on the contrary, if it be made to cut them transversely, it not only dilates itself, but always keeps open. Convinced of the truth of this assertion, he performs this operation in the following way: He first separates the half of the lucid cornea in the same manner as if he was about to perform the operation for extraction, and then taking a pair of very fine scissars, he enters one blade through the iris, at the distance of a half line from the lower part of the circumference of the cornea, and at the distance of a half line from the side of an imaginary one drawn through the constricted pupil. He then directs the incision upwards. In this way he has often performed the operation with the best effects.

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If the eye is affected with an atrophía, the radiated fibres of the iris are never on the stretch although the pupil be closed; and in this case the opening that is made does not dilate, but soon closes again. In such cases, therefore, this operation ought never to be undertaken.

The incision of the iris ought always to be made towards the inner side of the concreted pupil, never towards the opposite one, otherwise the person soon learns to squint. Mr. Janin endeavours to account for this from the direction of the axis of vision.

In one case, the wound of the iris ran into suppuration, and the capsule of the lens became opake. But he assures us, that this is a very uncommon occurrence, and that it may be prevented by proper preparation before the operation, and prudent management after it.

In another case, the opening was made too large, and as this admitted too many rays of light, the patient saw but little when exposed to a strong light. This inconvenience was corrected by the use of a piece of card blackened, in the middle of which was a hole about the size of the natural pupil. As soon as the

patient found himself exposed to a strong light he covered his eye with this card, and could then see distinctly.

I cannot say any thing from my own experience concerning this method, for I have never performed it; but according to all appearance it seems to deserve approbation. There is one particular case, however, in which I would perform the operation in a different way. It sometimes happens, that although the greatest part of the cornea has become opaque in consequence of a leucoma, still one spot shall remain clear; but when this spot is not almost directly opposite to the pupil the patient can see little, or not at all. The sight, however, may be in good measure restored to the patient by perforating the iris opposite to this lucid place. Now, supposing this spot to be situated near the lower circumference of the cornea, and that we were to carry an incision through it, as recommended by Janin, we should run the risk of rendering that very spot opaque. In such a case, therefore, I would take the knife recommended by Mr. Cheselden^d, and penetrating the cornea in an

^d See Sharp's Operations, p. 120, plate x. fig. C.

opaque part, would make an opening with its point in the iris, as nearly opposite to the lucid spot as I could, in such a manner, however, as to cut the fibres transversely. Mr. Odhelius relates a case, where a man that had his sight impaired from such a cause, was cured by a small opening in the iris, which took place of itself^c.

C H A P. IX.

Of the Membranous Cataract.

THERE is, in fact, such a cataract: but the membrane which occasions it is not a preternatural one, as believed by the antients, but one of the lamellæ of the capsule of the crystalline lens, which has lost its transparency, and prevents the rays of light from passing to

^c See the Memoirs of the Academy of Sciences of Stockholm, v. xxix.

the retina. Sometimes it is only the anterior portion, sometimes the posterior alone; and at other times both together are affected. In the second of these cases it is but rarely that the lens remains long uninjured; the disease generally communicates itself to it, and hence it is but seldom that we find the opacity confined to capsule alone. Baron Haller, however, mentions a case where the lens was transparent, and yet the whole of the capsule was opaque^f.

The nature of this cataract is not often known previous to the operation. The symptoms are not only so uncertain, and many of them so imaginary, that I am in doubt whether I ought to relate them.

It is said, that when the posterior portion of the capsule is opaque, the opacity seems concave, and at a good distance behind the pupil; whereas, on the contrary, it is convex, and near the pupil, when the disease is seated in the anterior portion of the capsule. But the opacity of the lens generally prevents our seeing the posterior part of the capsule; and this same opacity of the lens may appear

^f See his *Opuscula Pathologica*, p. 12. observ. 3.

equally convex, and near the pupil, as that of the anterior portion of the capsule.

It is not true, that where the capsule is opake the patient becomes incapable of distinguishing light from shade. Experience evinces the contrary; and are there not cases innumerable, where the patient being incapable of distinguishing light from shade, still the capsule has not been found at all affected. I remember once to have been perfectly convinced in my own mind of the presence of a membranous cataract, and yet upon performing the operation, I found only a common one, consisting of an opacity of the lens alone.

There was another case where I think I at once ascertained the cataract to be a membranous one.

A taylor-boy who had been long subject to a redness and weakness in his eyes, happened, whilst sewing, to push his thumb with great violence against one of his eyes. Immediately after he felt an acute pain in it, which continued several days. In the mean time he applied a bandage to it, and made use of many nostrums. Upon removing the bandage some days afterwards, he found that he was quite blind.

blind. He came to me ten days after the accident, and was then incapable of distinguishing light from shade. The pupil dilated and contracted itself freely, and there seemed to hang out of it into the anterior chamber a white opaque membrane, resembling a kind of sack, which in all probability was the capsule of the lens; but as the patient would not submit to the operation, I could never come to a certainty concerning it.

Those who in extracting the lens puncture, and cut the capsule as much as possible, according to the rules I have given, have little to dread from its future opacity, as it is thus generally destroyed by this operation.

Whenever the capsule is cut, the lens projects forward, and must be extracted whether transparent or opaque; for if it be left there is great reason to dread that it may in time become opaque, and cause a *crystalline cataract*. When, therefore, the anterior portion of the capsule only is opaque, the operation is to be performed exactly as if it was a cataract of the lens itself, with this only difference, that where its nature is early ascertained, we ought to cut and puncture the
capsule

capsule much more than is otherwise commonly done.

If after this the lens is extracted the pupil remains still as opake as before ; and if this opacity seems to lie further back than what it did before the operation ; if the opacity seems now to be altered in point of colour ; or if the lens that is extracted be transparent, and the pupil still as obscure as before the operation, there is reason to believe that the posterior portion of the capsule is opake : still it behoves the surgeon to take every possible care in order to discover whether this obscurity does not proceed from a portion of opake lens, or kind of mucus, remaining in the capsule. And what is now to be done ? In a former part of this treatise I have advised the operator to destroy the anterior part of the capsule as much as he can with the cystotome of Mr. La Faye. But as these incisions may again close, and as the allowing this opake body, the capsule, to remain behind in the eye, is at all times to be dreaded, it will be most prudent to endeavour to extract the whole of the capsule by means of a small hook. Both Mr. Heuermann

mann^s and Mr. Janin^h, have performed this with the best success.

^s See his *Bemerkungen*, 1 B. p. 261.

^h See his *Mem, et Obs. sur l'Œil*, p. 255.

I am convinced that the capsule may be very easily detached, and am apt to believe that in the operation of couching, the lens does not escape out of its capsule, but that it is forced to the bottom of the eye along with it. Indeed, if this were not the case, it would be no easy matter to conceive how the lens should again so readily rise up to its former situation. If the capsule remained behind, it would be compressed together by the humours of the eye, and the cataract therefore could not return within the capsule, especially after some time had elapsed, consequently could never resume its former place: and supposing the capsule to have remained in its place after the operation of couching; how could it happen that the lens should not only rise up into its former place, but sometimes pass into the anterior chamber, at the distance of two years from the date of the operation? Through what passage could the lens come? But experience has also demonstrated to us, that the capsule is, at least now and then, carried along with the lens in couching. Mr. Janin relates a case where a cataract that had been depressed, again rose up, and got into the anterior chamber of the eye. He extracted it, and found it covered with its capsule.

It is not easy to conceive that the couching-needle is always made to pass into the body of the lens, and extricate it from the capsule. I am convinced that the needle sometimes does not penetrate the capsule, but is now and then applied upon it, and depresses it along with the lens. Besides, granting that the needle does always penetrate the capsule, is it possible to depress the lens, and leave the capsule remaining? I have often performed the operation of couching on dead bodies, and generally found that the capsule was depressed along with the lens: which circumstance gives one advantage to couching over extraction.

I once extracted the capsule quite easily, and without any bad consequences, and shall in future make little hesitation about attempting this, as the arguments which Mr. Janin makes use of in order to prove that the capsule of the lens is perfectly distinct from the membrana hyaloidea, and that it can be easily separated both from the ciliary processes and from the vitreous humour, appear to me quite conclusive¹. It is true, if we could but know beforehand that the capsule was opaque, we might then take a much shorter method, and extract the capsule along with the lens, in the same way as I have described in the chapter on the concreted cataract.

The most frequent kind of membranous cataract is what is called the Secondary Cataract (*Cataracta Secundaria*) and which Mr. Morand^k and Mr. Hoin^l first observed and described.

This secondary cataract consists in an opa-

¹ Loco citato, and also the author's Surgical Bibliothek. v. ii. part i. p. 99.

^k See l'Histoire de l'Acad. de Sciences de Paris, ann. 1722, p. 15.

^l Memoires de l'Acad de Chirurgie, tom. ii. p. 425.

city of the capsule, which is never present before the operation, but which seems to arise in consequence of the inflammation that generally follows the operation.

The pupil, which was quite clear before the operation, is, upon the tenth or twelfth day, when we open the eye, discovered to be dim and obscure; but this dimness is very different from that of the cataract before the operation. Surgeons ought to pay particular attention to this, in order that, should it take place after couching, it may not be taken for the lens which has risen up. Indeed it occurs more frequently after couching than after extraction.

I have performed the operation of extraction very often, and have only met with two cases of a secondary cataract; both of which, however, disappeared in a short time.

In the operation for extracting the cataract, the posterior portion of the capsule does not suffer any injury, and therefore seldom becomes inflamed or obscure. The anterior portion, it is true, suffers considerably, but as it is almost annihilated, it seldom becomes an obstacle to vision. In the operation of couching, however, the posterior portion of the capsule

sule always suffers, and the anterior one very often; on which account it is liable to become inflamed and opake *.

The secondary cataract is not so much to be dreaded as some are inclined to think. It decreases very often as the inflammation decreases, and the redness and opacity very often disappear together, leaving the eye of its natural colour, and the pupil clear and transparent.

The external use of white vitriol, of sugar, borax, Spanish flies, and other discutient remedies, promotes and hastens this effect. The same remedies, joined to the administration of mercury, are often beneficial when the secondary cataract remains, after the inflammation is gone.

Should the opacity not yield to these remedies, I would make an incision in the cornea, and extract the lens. Mr. Janin has performed this so late as six months after the operation of extraction, and with the best suc-

* Why the author should adduce this as an objection to the operation of couching, after the strong and convincing arguments which he himself has so lately made use of to prove that the capsule is generally carried to the bottom of the eye along with the lens, I cannot conceive. T.

cess. In such cases, however, the capsule is generally concreted to the iris, and is therefore not always so easy to be detached; nay, this is sometimes altogether impossible.

C H A P. X.

On the morbid Consequences of the Operation.

THAT surgeon has only performed the half of his duty who has dexterously executed the operative part. The preparing the patient for the operation, and the proper management, so as to prevent and remedy all bad symptoms which often occur after it, make up the other half, and which, beyond all doubt, is equally essential with the first.

Most of the itinerant oculists acquire, in fact, a certain dexterity of hand, by which they in general perform the operative part with ease and success. But they soon forsake the unhappy patient, who, bouyed up with the
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fond hopes of soon enjoying the pleasures of sight, patiently suffers the most acute pain and agonies ; and at last, when the bandage is removed, finds that, instead of his former blindness, which was curable, his sight is now irrecoverably lost. These men not only altogether abandon their patients, but at the same time deprive them of the aid they might perhaps receive from a regular bred surgeon. They present to them a few inert nostrums, with strict orders that no other remedy be used. The patient, full of confidence in his oculist, strictly follows his advice, and rejecting every assistance from the scientific surgeon, remains for ever blind.

The most frightful of all the accidents which occur after the operation is the inflammation : when even in a small degree, it weakens the sight that was restored by the operation, but altogether destroys it when violent. When once an inflammation has taken place, it is generally long and tedious of discussion ; consequently he acts the more prudent part who adopts every timely precaution to prevent it, than he who waits to discuss it after it has taken place. It is a false notion that the inflammation is gene-

rally more acute after extraction than after couching. I can say, from my own experience, that, except in three or four cases, and I have performed this operation often, I never met with a very violent inflammation. I ascribe this fortunate success chiefly to the strict observance of the following rules, which I shall now communicate to my readers. And why should a greater degree of inflammation arise in consequence of this operation, where the almost insensible cornea alone suffers, than after couching, in which most of the membranes of the eye are pierced, and the internal part greatly disturbed? If, indeed, the surgeon performs his part in a bungling manner, or operates on such who from faults in their constitution are improper subjects for such an operation; or, if the surgeon is unacquainted with the remedies by which a stop can be put to the inflammation, or neglects to use them, a violent inflammation may certainly take place. But surely this is not so much the consequence of the operation as of the ignorance and imprudence of the operator.

Soon after the operation, a number of distressing symptoms appear, such as cramps
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and tension, which agitate the whole nervous system. Some patients feel, after the operation, a degree of languor and prostration of strength, whilst others, although the operation be perfectly well performed, are seized with an unaccountable dejection and oppression of spirits. Some complain of great anxiety, others are seized with sickness and vomiting, or with colic pains, or a sense of tension in several parts of the body, or have their whole body shook with a convulsive tremor. Many complain that the eye which has been operated on rolls violently and involuntarily up and down, under the bandage. Very often a purge, which the day before the operation would have had a due effect, has none after it. Under such convulsive affections of the whole nervous system, the equal distribution of the blood must necessarily be very much disturbed, so that too great a quantity is directed to some parts, whilst others are deprived of what is usual to them: and thus a fever and inflammation arise.

In general, we observe a double kind of fever. The first precedes the inflammation, and seems to be the cause of its appearance; the other arises after the inflammation, and seems to be an effect of it. If the first

fever be high, we may always expect a violent inflammation; and on the contrary, when the fever is gentle or moderate, we may generally rely on the inflammation being so also.

This fever usually commences on the first night, increases the second, and is at its height the third. The pain and inflammation commonly make their appearance after the third paroxysm, that is, the third night after the operation. During the two first days the patient seldom feels any, even the smallest pain. It is really astonishing, that the inflammation arises so late, when one would be apt to suppose that nature had entirely forgot the small injury that had been done to her. The inflammation, however, does sometimes appear sooner, sometimes later. The more violent and frequent the symptoms are, which point out an agitation of the nervous system, the more violent is the fever, and the sooner does it come on; and the more violent the fever is, the more violent is the subsequent inflammation. Such, at least, is the general course of these appearances. They do, indeed, suffer a little variation in some particular cases; but upon the whole, it seems, as if the affections of the nervous system which occur soon

soon after the operation, were the cause of the inflammation and fever; at least, it is necessary to prevent and alleviate them if we mean to prevent the inflammation.

These nervous affections proceed, without doubt, from the fear and anxiety with which the patient is seized before the operation, and also from the irritation which this last occasions. Long and repeated experience has taught me, that these distressing symptoms, which happen after the operation, are much more violent in weak and timorous people, who are at the same time possessed of great nervous sensibility, than those who have firmer and less irritable nerves. Those who from nature seem predisposed to inflammations, such as people of a strong, vigorous, and plethoric habit, are most often affected with a mild and gentle ophthalmia; whilst, on the contrary, those weak, delicate, and irritable habits which I have already mentioned, and whose blood is thin and acrid, are generally affected with the most violent and obstinate inflammations. I once performed this operation on a woman of a masculine and robust habit, with a ruddy copper-coloured countenance, much addicted to the drinking of spirits, and who

had laboured under an obstruction of her menses for nine months before : I confess that in this case I expected the most violent inflammation, and yet no bad symptom occurred. In one word, those who are strong and healthy, whose blood is of the best quality, and whose nervous system is no ways disposed to cramps and irregular agitations, are by much the most eligible patients for undergoing this operation, and have least to fear for the consequences. This operation, on the contrary, ought not to be attempted on those who are subject to frequent headaches and opthalmias, and who are of an irritable habit, &c. without a sufficient and careful preparation.

The method I adopt in order to prepare the patient is, to remove all kinds of stimuli from them, to dilute the mass of their fluids, and relax their fibres ; in a word, to bring them as much as possible into that kind of state which is least disposed to convulsive and other irregular affections. Blood-letting always diminishes the force of the circulation, relaxes the solids, and is therefore useful to such as are plethoric, and of a strong elastic fibre. I generally perform it, therefore,

two days before the operation, and also after it, when the pulse is hard and quick, and the pain and inflammation violent. The surgeon must be very cautious, however, not to attempt this with weak irritable habits, for by doing so, he will only render them more inclined to convulsive and other irregular agitations.

Particular attention must be paid to the state of the *primæ viæ*; for here there often lies concealed a stimulus, which is in itself capable of producing the utmost uneasiness and disorder throughout the whole body, and which at least seldom fails to augment the irregular commotions which follow the operation. I have often observed very violent inflammations to arise entirely from some irritation in the bowels, and which disappeared as soon as these were cleansed; on which account they ought to be well emptied previous to the operation, and, indeed, they also require particular attention afterwards. Weak and delicate patients are very apt, about the second day, to have their tongue become foul, accompanied with a disagreeable bitter taste in their mouths, and many other symptoms, which, although the bowels had been previously

ously well cleansed, still show that bilious and other impurities are collected there. These increase and prolong the inflammation very much, especially in those who are troubled with nervous affections after the operation, and require more attention, as they are generally accompanied with a tendency to costiveness.

Gentle laxatives, the use of the vitriolic acid, and when these are not sufficient, gentle emetics, seldom fail to relieve the inflammation, fever, and every other bad symptom. It is always a good symptom when the patient has a stool naturally the second or third day, and feels no uneasiness in his bowels.

The symptoms of these impurities often arise very suddenly, especially after certain affections of the mind. A man on whom I performed this operation, and who, till the fifth day after, had been perfectly free from every bad symptom, was seized on the sixth evening with a violent fever, accompanied with great pain in the eye. The next morning the symptoms had abated a little, but they returned with double violence towards night. The patient was very restless, complained of a bitter disagreeable taste in his mouth, and
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a total loss of appetite. Upon enquiring into the cause of this sudden alteration, I learnt that the patient had been much frightened the day before by a fire which had broke out in the neighbourhood. The use of the vitriolic acid and gentle laxatives removed all these complaints in the course of a few days.

The principal cause of the nervous affections is certainly the agitation of mind which the patient suffers before and during the operation. I remember two female patients of mine, who both fainted during the operation. Even the most insensible seldom become agitated when the moment approaches, that is to decide in part the happiness of their future existence. The surgeon ought, therefore, to endeavour, as much as lies in his power, to soothe and calm the spirits of his patient.

The success of this operation is always doubtful, and the most dexterous oculist can never promise, with certainty, an happy event, even under the most favourable circumstances. A trifling and unforeseen accident is often sufficient to destroy in one moment our best hopes. On this account, I would advise every surgeon not to risk his credit by too

rash promises. At the same time, prudence also requires it of us not to depress the spirits of the patient by any tedious and unnecessary harangue about all possible dangerous consequences. My rule of conduct in this matter is, to conceal the uncertainty of the operation as much as possible from the patient himself, but at the same time to give a candid account of it to his friends. This is so much the more necessary as the itinerant oculists have so blinded the generality of men, that they look upon success as the necessary consequence of the operation ; hence it does not become an object of their hopes and wishes, but they exact it of the surgeon as a matter of right, not considering how much depends on circumstances. The surgeon, indeed, gives them some cause to do so, if, when by imitating the conduct of the quack, he confidently promises a successful issue to the operation.

Some days previous to the operation, I endeavour, by means of various remedies, to diminish the irritability and too great sensibility of the habit. I generally put my patients on a cool vegetable diet, and as animal food, wine, and aromatics, are apt to heat the blood, I strictly forbid them. The tepid bath, and
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the administration of emollient glysters are of service. An hour or two before the operation, and also soon after it, I cause the patient to swallow a few ounces of recently expressed oil of sweet almonds, with lemon juice: this allays all cramps and tension of the belly, and keeps it gently open. When the cramps which sometimes follow the operation are violent, I order emollient glysters, a few drops of laudanum, balsamic soups, &c. I think myself warranted to assert, that owing to this management (which is founded on the experience and rules laid down by many celebrated surgeons in other operations^m), very few of my patients ever have a violent ophthalmia.

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^m The very famous Le Cat always ordered the use of the tepid bath to his patients, after the operation of lithotomy, and it is well known what success he had in this operation. Monsieur Mareau, first surgeon to the Hotel Dieu, at Paris, generally foment the whole of the abdomen, after this operation, with emollient oily and sedative remedies, and seldom loses a patient. After gun-shot wounds, by which the whole nerves of the body are violently shook and irritated, Mr. Boucher strongly recommends the use of the warm bath, and also to foment the part with emollient applications. The great success which attended this treatment, is proved by a number of cases related by him in the fifth volume of the *Mem. de l'Acad. de Chir. de Paris*, p. 300, edit. in 8vo. The object of all these methods is to relax
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There are many who prefer the spring and autumn for performing this operation, on account of the greater clemency of the weather during these seasons. But to such a rule I pay little attention, and have not only performed this and other operations myself in every season of the year, but have seen it often performed by others, without any bad consequences. It is true, that intense cold or excessive heat are prejudicial to the patient; but the temperature of the patient's bedchamber is always so much in our power, that we may imitate any season of the year in respect to mere heat or cold. But is the weather, during spring and harvest, always so very moderate with us? Are they not the very seasons in which most epidemics prevail? And is it not to be dreaded that a patient, at that time of the year, however healthy to all appearance, may have the seeds of these epidemics in his habit, which may break out soon after the operation.

the fibre, and prevent cramps. This method of treatment was adopted by Mr. le Dran, after all operations; and indeed it is principally to this that he attributes the very great success that attended his practice. See his *Operations of Surgery*, chapter on Lithotomy.

Immediately

Immediately after the operation, I apply a cataplasm, composed of apples, saffron, and camphor, to the eye. This cataplasm allays the uneasiness and pain which arise from the operation. It ought not, however, to be thick or bulky, in order that it may not press too much on the eye.

Some moisten the eye during the first days after the operation with brandy and water, but with what intention I cannot conceive.

Very great caution ought to be had in trying experiments with the eye immediately after the operation; for although they may afford some entertainment to the spectators, yet they are generally attended with serious consequences to the patient. By such experiments does the Charlatan endeavour to excite the surprise and astonishment of those who witness his operation, and to inspire his patient with the firm belief that his sight is now perfectly restored. By this means also he generally attempts to secure a speedy and honourable retreat, and then leaves his patient to the hand of fate. Such experiments inflame and irritate the eye, occasioning a great derivation of fluids to the part, and exposing the patient to the danger of being
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for ever blind. Immediately after the lens is extracted, and the pupil clear, I bind the eye down.

I would strongly recommend it to surgeons not to open the eye before the tenth or twelfth day. An untimely and imprudent curiosity, both on the part of the surgeon and patient, is, I know, very apt to make them err in this particular. The patient, anxious to be in possession of the use of his newly acquired sense, and the surgeon, impatient to know the success of his endeavours, open the eye before the proper time, excite pain and inflammation, and sometimes worse symptoms, and by doing so, are apt to deprive themselves entirely of what was the very object of their wishes. The eye becomes so very sensible soon after the operation, that it can neither bear the light nor the air. When it becomes necessary to renew the bandage, I always cause the room to be darkened. I have often seen it happen, upon taking off the bandage in a room where the light was pretty great, that the patient has immediately shrunk back, and complained that, even through his eye-lids, it was too much to bear. To many this may seem an unnecessary precaution. But is there any precaution

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tion really unnecessary. Even on the tenth day, when the eye is commonly opened, harm may be done. The eye-lids are generally much swollen and glued together; therefore they must not be forced asunder with violence. The gummy matter, which is generally in great quantity on the eye-lashes, must be cautiously washed away with a little warm milk. Upon shutting the eye again, particular attention ought to be had that the eye lashes do not bend and get between the eye-lids. I remember once to have seen a most violent inflammation arise on the tenth day from this very cause.

The rule which we have given not to open the eye before the tenth day, admits, however, of some exception, such as violent pain, a prolapsus of the iris, or any other particular accident. In such cases the eye ought to be again opened, and the nature of the inflammation or other complaint examined. Acute pain is generally the mark of a violent inflammation. I have remarked, however, that this is not always to be trusted to as a certain characteristic symptom of its presence; for I have often seen violent inflammation, accompanied with little pain, and *vice versa*. I do not

pretend to explain this; Perhaps it depends much on the habit of body of the patient. Some people complain a great deal of that which others seem hardly sensible of. The pain seems to me to be always greatest at the beginning of the inflammation, and to diminish afterwards, although the inflammation suffers no change. In general it increases during the night, towards morning it decreases, and sometimes entirely subsides, although the inflammation is just the same. The pain and inflammation commonly commence about the third and sometimes the second day after the operation; nay, I have known it take place the first. I once performed this operation on a woman, who was attacked with a painful inflammation so early as eight hours after the operation. The pain is generally very violent the third night, and abates on the fourth; on the fifth it again increases, the sixth it diminishes, and so on. These symptoms of inflammation sometimes continue in full force until the seventh, sometimes the eleventh day, and then begin gradually to subside.

On the fourth day, I commonly moisten the eye three or four times with Goulard's

extracts, and then apply compresses dipt in the same. These compresses, however, must not be too wet, for I have remarked, that too much humidity is prejudicial to the eye.

It is bad practice to apply a plaister upon the eye: the humidity, which always flows in great quantity from an inflamed eye, is collected under the plaister, and keeps the eye soaking, as it were, in a continual bath. A simple bandage is much better; but it ought not to be applied too tight, else it is apt to irritate and inflame the eye.

Mr. Demours has invented a machine made of wax, with which he covers the eyeⁿ. It is concave, and applies close upon the whole anterior surface of the eye—an unnecessary and really inconvenient invention. I cover the eye with a thin compress, and bind it loosely on with a bandage. The compress may be fixed to the bandage with a pin, and in like manner the bandage ought to be attached to the night-cap. This simple bandage neither irritates nor presses upon the eye, and yet is perfectly secure. Particular at-

ⁿ See the Journal de Vandermonde, tom. 16, anno 1762, p. 58.

tention, however, ought to be had to prevent any folds in the compress.

The wound of the cornea generally closes in two days. At first it has a whitish appearance, and is at the same time a little tumid, but these gradually disappear; and if the incision has been properly made, a scar is seldom to be observed afterwards. Commonly in about fourteen days after the operation, not the smallest mark of a wound is to be discovered. Some say, that the wound now and then runs into suppuration, which may, perhaps, happen where the patient is of a bad habit, or where the knife has been blunt; but it is a circumstance I myself have never seen.

When a violent inflammation takes place, both bleeding and purging become necessary. And one copious venesection is of more service than two or three sparing ones.

The tunica conjunctiva sometimes swells so much as to protrude between the eye-lids. In such a case Mr. Janin cuts the protruded portion away with a pair of fine scissors, and assures us, that the local hæmorrhage, which is in consequence produced, affords the most speedy and best relief. It may therefore be
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worth while to try this, which I confess I have never done.

When the inflammation has abated, but at the same time seems inclined to become chronic, blisters are of essential service, especially if applied to any part near the eye. I generally lay one fully larger than the hand on the nape of the neck, and at the same time one behind each ear, and on the temples. When the inflammation is very violent, the cornea becomes sometimes so thick and muddy, that it is impossible to discover the pupil. This thinness gradually abates with the inflammation; and, should it remain much longer, it commonly yields very soon to the use of blisters and white vitriol. By means of these remedies, I have often removed the obscurity of the cornea in less than a fortnight.

It appears to me, that a too long continued application of the bandage is now and then a cause of the continuance of the inflammation. I have seen the eye a little red eight weeks after the operation. As long as the bandage is kept on, the eye is always as it were in a warm bath, which prolongs the inflammation. Under such circumstances, let the eye be frequently opened, and bathed

with cold water, and the remains of the inflammation will soon disappear. The Peruvian bark, taken internally, is, in such cases, of great use.

When all the redness of the eye is gone, I also generally give the bark. It restores the vigour to the body, which has been debilitated both by medicines and a spare diet, and at the same time strengthens the sight very much.

In some cases a few occasional symptoms of inflammation remain for a considerable length of time after the operation, appearing one day, and disappearing the next. The most common of these are a pain in the eye itself, and about the eye-brows, a certain degree of uneasiness throughout the whole body, flying heats, and a quickness of pulse. The following day the patient feels himself pretty free from all these symptoms, but they come again the next day, and thus continue to alternate: People of a weak and irritable habit are the most liable to such complaints; which generally yield very soon to the Peruvian bark.

The patient must at first be extremely cautious in using the eye that has been operated

rated on, as it cannot then well bear either the action of air or light. At first I allow the patient to keep his eye open in a room where the light is moderated; and when he goes out I cause him to cover it with a bit of crape. Thus the eye accustoms itself gradually both to air and light. By an imprudent and premature exposure of the eye, it becomes very much weakened, and seldom afterwards recovers its strength. At all times, indeed, the patient ought to have particular care of it, as it is a part which is become much weaker than usual, and which easily suffers.

The surgeon ought to feel himself much interested in recommending so strict attention and caution in the use of the eye which has been operated on. Envy and ill will, although indeed not always these, but sometimes also stupidity and ignorance, lead many to expect from the surgeon, not only the aid that lies in his power, I mean a restoration to sight by means of a successful operation, but also that which it is out of his power to command, and willingly attribute every accident, whether it happens in the course of the first twelvemonth, or at the end of ten

years, to a want of knowledge in him. At the same time, I am apt to believe, that however unjust these expectations are, yet the operator has it in some degree in his power to assist their being fulfilled, and prevent the danger of the patient's again losing his sight, and that by always extracting the capsule alongst with the lens; for those who become blind after the operation generally do so from an opacity of this membrane. And not only does this part become obscure, but at the same time forming adhesions with the iris, it draws it together, inso-much as at last to totally close the pupil. Nor is this to be wondered at, the capsule being a part which has suffered much, and is now become quite useless. This second blindness is indeed not always incurable, for the cornea may be again opened, and the capsule extracted. But it would surely be much better to prevent it. And is not this to be best done by extracting the lens? Is not that method, which I have already described in the chapter on the concreted cataract, always practicable? I would fain hope to be soon able to answer these questions from experience.

C H A P. XI.

On the Purulent Eye.

IT is seldom that the eye runs into suppuration if proper attention be paid to the rules which I have already laid down. One single case only of this kind has ever happened to me during the whole course of my practice ; and, after all, a purulent eye is, in fact, not so much to be dreaded as many think ; for by proper and timely aid the sight may be again recovered. It is not always necessary to have recourse to an operation to discharge the pus ; it is often possible to discuss it. This, indeed, I have never done myself, for I generally perform the operation as early as possible ; but Mr. Janin, Mauchart, and several others, assure us, that discutient applications have performed a cure even in those cases where both anterior and posterior chamber of the aqueous humour were full of matter, and where the eye seemed ready to burst. Mr. Mauchart especially recommends aromatic fomentations, and the scarification of
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the internal surface of the eye-lids. Mr. Janin supposes, that the promoting the exudation of the purulent matter through the pores of the cornea is what we ought chiefly to have in view, and on that account makes use of emollient fomentations, such as a decoction of marsh mallows. I should be afraid, however, that this would relax too much, and make the cornea apt to give way; a circumstance which is always to be dreaded *.

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* Were I to judge from opinion alone, I confess I should at first be apt to join with the author in condemning the use of this remedy. But Mr. Janin, in his chapter on the purulent eye, in his work intituled, *Observations sur l'Oeil*, speaks in so confident a manner of the great success which he himself has had from the use of this remedy, that it seems unfair to oppose a mere conjecture to what a respectable writer assures us to be a matter of fact and experience. This decoction of malva, he says, seldom fails to disengage the pus contained in the eye in about twelve or fourteen days. He directs the eye to be frequently bathed with the decoction, and that a compress dipt in the same, should be applied in the intervals. How an emollient and relaxing remedy should produce the same effect as the stimulant one recommended by Mr. Mauchart, is a difficulty which is not so easily solved. The theory from which Mr. Janin takes his indication of cure, namely, that of opening the pores of the cornea, is certainly a most questionable and unsatisfactory one: it arose when the use of the absorbent vessels was unknown, and it is really strange that it should still gain credit now that these are so well ascertained. Were I to hazard a conjecture on the use of these two remedies, I should suppose that they had been employed at two different stages of the

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It commonly requires a considerable time before the discussion, if the pus is entirely completed, generally requiring ten or twelve days. And now the question arises, Is it possible that this matter may remain so long in the eye, without doing any injury? Is this slow and uncertain discussion to be preferred to the operation; which is neither painful nor dangerous, and by means of which the pus will most undoubtedly be discharged? For my part, I must confess that I know of no one good reason why the discussion ought to be preferred to the operation. The latter method is quick, and sure; the former slow, and uncertain. I have performed this operation several times, with the very best success, and can therefore recommend it from my own experience. If, however, there be but

the disease. At the beginning, where there is a good degree of active inflammation present, not only new matter is continually forming, but the absorbents, from the disease of the part, are incapable of acting. The emollient application of Mr. Janin in this case would be the most advisable, as tending to relax the part, and diminish the too great action of the blood vessels. But on the contrary, in a case of some standing, where all inflammation had subsided, and the faults seemed to lie in too weak an action of the absorbents, the stimulating remedy of Mr. Mauchart might perhaps be the best. T.

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little pus collected, and that the patient dreads the operation very much, it may be delayed, and discutient remedies tryed in the meantime. But as soon as both chambers seem filled with pus, there is no longer any time to be lost; the possibility of discussing it becomes doubtful, and the total loss of the sight is much to be dreaded from the long continued presence of the purulent matter. In such a case as this, I would not hesitate an instant about performing the operation. I must at the same time confess, that I never have attempted the discussion under such circumstances, and therefore am unable, from my own experience, either to recommend or condemn the practice. But to judge from appearance, it seems to me a very doubtful means of cure.

The particular place in which the pus is first formed, is different in different cases; sometimes in the anterior, sometimes in the posterior chamber. This distinction is, indeed, of little moment, as both these chambers make up but one space, and it very seldom happens that the pus, except when in small quantity, is confined to one of the chambers. This distinction, however, ap-
pears

pears of such consequence to Mr. Mauchart, that he not only gives a different name to it, according to the difference of its seat, but also recommends a difference in the method of cure. When the pus is contained in the anterior chamber, he calls it hypopion, and when in the posterior one, empyesis. In this last case, he takes a double edged couching-needle, and entering it about the distance of one line from the cornea, makes it pass into the posterior chamber, and then withdraws it, expecting that the pus will flow out through the puncture. This, however, seldom or indeed never happens, for the purulent matter is so thick, that it cannot pass through so narrow an opening; and consequently this immediately contracts itself.

This seems to have struck Mr. Mauchart himself, for he proposes to insert at the same place a small trocar, instead of the needle, and to allow its canula to remain there until all the matter be discharged. But is it possible to allow a hard body, such as the canula of a trocar, to remain for some days in the posterior chamber of the eye, between the iris and capsule of the lens, without occasioning the most acute pain, the most frightful inflammation,

tion, an opacity of the cornea, and a total loss of the eye? How is it possible to fix such an instrument, in order to prevent its falling out? And is it probable that so thick and tenacious a matter should flow through so fine a tube? At all times it is dangerous to introduce any instrument into the posterior chamber of the eye, for it certainly does always wound the ciliary processes, and very often the iris or capsule of the lens; parts, the laceration of which is not always so trifling an accident as many perhaps believe.

All these difficulties the operator draws upon himself unnecessarily. A moderate opening in the cornea procures a ready discharge to all the pus contained in the eye; for the way through which it may escape (the pupil) when in the posterior chamber is open and free.

The incision in the cornea can be easily made, and without any dangerous consequences. I make an incision in the inferior portion of the cornea, with the same kind of knife with which I perform the operation of extraction, or, in place of it, a pretty strong lancet will answer the purpose. In this manner all other instruments invented for this

this purpose become unnecessary. When pus is formed soon after the operation of extraction, it is seldom necessary to make another incision in the cornea ; for in general, in this case, the wound through which the lens was extracted commonly opens again of itself, or so slightly adheres, that it can easily be opened with the point of the knife.

The opening in the cornea must not be made too small, on account of the thickness and tenacity of the purulent matter. I generally make it so large as to comprehend a fourth part of the cornea ; and yet in spite of this, the matter does not all flow out at once, but gradually oozes out. Some who seem anxious to have it all evacuated at once, recommend the diluting it, and washing it out by means of a syringe. I shall not attempt to determine whether this method may always be put in practice with ease and safety ; but I am apt to believe that it is in most cases superfluous. The method I adopt is as follows.

As soon as the incision is completed, a drop of the matter commonly follows the knife. I then instantly bind the eye down, without giving myself any concern about the quantity
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that remains in it. Upon removing the dressings six or eight hours afterward, I commonly find a little of the purulent matter on the compress. If this be the case, I again instantly shut the eye. Should the compress at next dressing be found quite dry, and the quantity of pus in the eye seem but little or not all diminished, I immediately conclude that the wound in the cornea is closed; upon which I separate the lips of the wound by means of the point of the knife, and continue to do this at any time when the compress appears quite dry, until the whole purulent contents be discharged. The eye suffers but little from this treatment. The aqueous humour, which is always secreting, dilutes the pus, and washes it out of the eye, and this is further promoted by the natural contraction of the elastic coats of that organ. It generally happens that all the pus is entirely discharged in the course of two or three days, and the surgeon need have no other concern but to keep the incision open. For my part, I do not think it possible to procure a more easy, quick, or safe discharge to the pus than this. At least, I myself have frequently, by this method, restored several people to their sight, in
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the course of three days, who were blind from this cause. In three of these cases there was not the smallest mark of a cicatrix to be seen afterwards ; in two others, a very trifling one remained. The dimness and muddy appearance which the cornea commonly retains after this disease, generally yields very soon to the use of the white vitriol.

A remarkable case once occurred to me which I will relate. A young man about twenty was attacked with a violent ophthalmia, which terminated in suppuration. When I saw him, both anterior and posterior chamber were full of matter, and the cornea so much distended as to seem ready to burst. I made an incision in the inferior part of the cornea, through which a considerable quantity of pus flowed out. The following day, when the pupil became visible, I could observe that the crystalline lens had partly projected through the same, and was quite cloudy ; upon which I enlarged the wound, and extracted it.

I remember to have once seen the whole external surface of the cornea run into suppuration. It was quite obscure, and the conjunctiva which covered it seemed to be

entirely corroded. After the use of the white vitriol, these symptoms disappeared, and the cornea regained its natural transparency.

In one case of a purulent eye, the cornea remained very unequal after the cure, and yet the patient saw very distinctly. It is therefore not true that every inequality of the cornea causes squinting.

C H A P. XII.

IN order to conclude this subject, I will here relate the history of a few cases: They will tend to prove what I have asserted in former parts of this treatise. I do not mean to select the most successful, but the most instructive ones.

C A S E I.

A man of about forty-five years old, of a healthy and robust constitution, had a cataract in both eyes; the one in the right was
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of ten years standing, the one in the left only two; the cataract in the right eye was of a pearly colour, with a few brownish streaks here and there: the motion of the pupil was free and easy. I ordered him to be blooded, to have a pediluvium, and to be gently purged. On the fourth of October, I performed the operation. As soon as the incision in the cornea was finished, and the capsule opened, the lens approached the iris, began to dilate the pupil, and, upon my making a very slight pressure, it glided out: but as the pupil still remained quite opake, I continued to press gently, and, in the course of a few minutes, forced out two opake pieces, which, in point of colour and consistence, exactly resembled the lens itself. They were not fragments, however, of the lens, for that came out quite entire, and there were no marks on its surface, by which one might have been led to conjecture that any part of it had been broken off.

This cataract, which before the operation appeared of a pearl colour, was now discovered to be quite brown, and was so soft as to alter its figure as it passed through the

iris. After its extraction it could be squeezed between the fingers like a jelly.

As the pupil was now perfectly clear, and the patient could distinguish any object presented to him, I immediately bound his eye down.

He remained very well during the whole day, but towards evening was attacked with a slight shivering fit, accompanied with anxiety, and followed by heat. Notwithstanding this he passed a pretty good night, and next day, the fifth of October, was quite free of pain. Upon *my* opening the eyelids a very little at the internal angle, I could discover that the eye was free from inflammation.

I ordered him a dose of Glauber's salt, which, however, did not produce any effect. The same quantity, taken the day previous to the operation had operated violently. As often as I removed the bandage, the patient complained that the light was too strong for him to bear, even through his eye-lids, and requested to have the room darkened. Towards night the fever again recurred, and in a stronger degree than on the preceding evening.

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The sixth of October the eye was red and painful. The aqueous humour ceased to flow. I ordered him a cooling drink, and to have a glyster that evening. The fever again recurred at night, and the cold and hot fits were much stronger than the day before, and soon after the eye became very painful. The light which, on removing the bandage, now fell upon the eye through the eye-lids, occasioned but little pain.

On the seventh he had a blister applied between the shoulders, which diminished the pain.

The symptoms of inflammation gradually decreased under the continued use of purges and blisters, and three weeks after, he was so much recovered as to prepare for a journey. On opening and examining the eye, I found the wound of the cornea so perfectly healed, that one could hardly discover any mark of a cicatrix; but there appeared in the very centre of the pupil, which, by the by, was quite round and moveable, a small opake body, of the size of the head of a common pin, which, when the pupil contracted itself much in a strong light, rendered vision obscure. In a moderate, or

rather obscure light, however, the patient saw very distinctly.

I had an opportunity of seeing this patient five months afterwards: the strength and acuteness of his sight had increased to such a degree, that he could then read large print without the assistance of glasses. The opaque spot in the pupil had entirely disappeared. I again saw this same patient, six years afterwards: his sight was then as good as it had been five months after the operation.

C A S E II.

A strong and healthy peasant had a cataract in both eyes. That in the right eye was of four years standing, the other only of one.

On the 22d of October I performed the operation on the left eye, the cataract of which was of a pearl colour. The motion of the pupil was free and easy. The lens came out as soon as the incision was finished, and the patient saw instantly. The pupil was quite clear, but oblong. The cataract was quite white and soft, except in its centre, where it was hard, and of a deeper colour.

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I now wished to perform on the right eye; but the knife, instead of immediately entering the chamber of the aqueous humour, run the length of a few lines between the lamellæ of the cornea, owing, I suppose, to my having applied the knife too obliquely; and, on my withdrawing it, in order to give it the proper direction, the aqueous humour flowed out, the cornea became loose and flaccid, and I was obliged in consequence to desist.

The patient was bled soon after the operation, and was ordered to have his feet put in warm water in the evening. No febrile symptoms appeared; the patient slept well, and had no pain in his eye next day. On removing the bandage, he complained much of the light, although his eye was shut. I prescribed a dose of neutral salts, and a glyster to be administered towards evening.

Next day he found himself fully as well as the day before, and continued the use of the salts. But he had a slight chilly fit towards night.

On the twentieth of October I gently opened the eye-lids a very little, but could not discover the smallest degree of inflamma-

tion. The wound of the cornea was closed, and the chamber full of aqueous humour.

As the patient seemed in such good health, and quite free from inflammation and fever, I again performed the operation, for the second time, on the right eye, on the twenty-seventh of October.

The small wound which I had made at the first trial, five days before, was now no longer to be discovered.

The cataract in this eye was of a milk white colour. Just as the point of the knife got through the cornea at the internal angle, it wounded the edge of the upper eye-lid, which had fallen down a little, through the inattention of the assistant; immediately on this happening, both the eye-lids were violently closed together. This accident disturbed the operation greatly. The eye-lids, however, were separated, and I finished the operation successfully, without lacerating the iris. The crystalline lens came forward as soon as the incision was finished, and before I had punctured the capsule. It was entire, and so hard as to allow a considerable degree of pressure, without altering its shape.

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On examining the pupil it appeared quite thick and muddy. On which I introduced *Daviel's scoop* three different times, and brought away a thickish slime each time, after which the pupil remained clear, and the patient could distinguish the objects which were held near his eye.

The patient continued the use of neutral salts, now and then a pediluvium and glysters, and during the first days after the operation, remained entirely free from pain or any other complaint.

But these happy prospects suddenly disappeared. On the fourth of November I found the patient, whom the night before I had left in good health, restless and uneasy. He had had a violent fever, accompanied with much pain, all the night, and had slept none. These symptoms had abated towards morning, but again appeared, with redoubled violence, the next evening. The patient complained of a total loss of appetite, and a bitter disagreeable taste in his mouth. I gently separated the eye-lids a very little, and found the conjunctiva very much inflamed, and the cornea muddy and cloudy.

The eye which I had first operated on, had the

the following appearances: the conjunctiva was inflamed; the pupil oblong; a small quantity of the vitreous humour was prolapsed, and had, in passing over the inferior portion of the iris, forced it along it with itself into and through the wound in the cornea. The wound itself was dilated at that place where the prolapsed vitreous humour and iris hung out, but in every other point it was healed. The anterior chamber of the eye was filled with the aqueous humour. That part of the vitreous humour which protruded through the cornea was pale, and so compressed by the wound that it appeared to hang by a slender thread; this I easily separated, and then attempted to return the iris, but it was hard, almost entirely insensible, and so firmly connected with the edges of the wound, as to render its return impossible.

All these symptoms occurred in consequence of a violent fright the patient had sustained, occasioned by a fire which had broke out the night before in the neighbourhood; but they yielded so rapidly to the use of cooling purges and white vitriol, that the patient thought of setting out on his journey the eleventh of November. I allowed him to

go, as his domestic affairs would not admit of a longer absence. The unnatural figure of the pupil did not impede vision: he saw better, however, with the left than with the right eye.

As his eyes were very sensible to the impression of light, I desired him to keep them covered during his journey, and advised him to wear a piece of crape over them for some time after.

This same patient returned to see me four months afterwards, quite happy with the success of the operation. He assured me, that his sight had become better and stronger every day, and that he could then read large print with his naked eyes. The most remarkable circumstance was, that the pupil of the one had entirely lost its irregularity, and was now equally round and moveable with the other. He could discern distant objects, although not distinctly. I again saw this man in the month of May of the present year, being five years since the operation. His sight was then as good as it had been at four months after the operation.

C A S E III.

A woman, forty-five years old, much addicted to drink, whose face was blotched, and of a deep copper colour, came to me, and intreated that I should restore her to her sight. Her menses had left her nine months before. She was blind of both eyes. The cataract in the left eye was of two years standing, and of different shades of colour; the motion of the pupil was free, and the patient could distinguish light from shade. The cataract in the right eye was pale, and only in an incipient state.

I caused this patient to be bled, and use a pediluvium, prescribing at the same time, some laxative medicines; after which, on the third of July, I performed the operation on the left eye, and, in doing so, I made use of *Pamart's spear*. A small blood-vessel was wounded by the point of this instrument, and a slight hæmorrhage ensued, by which the whole external angle of the eye was coloured with blood.

In beginning the incision through the cornea, I entered the point of the knife too near the sclerotic coat; owing to which the iris advanced

advanced so much forward, that it was with the utmost difficulty I could make the knife traverse the anterior chamber of the aqueous humour without lacerating that membrane. Scarcely had I punctured the capsule, by means of La Faye's instrument, than a drop or two of a milky liquor flowed out, and soon after it came the lens; but the pupil still remained obscure and dark. I pressed gently on the eye, and forced out a small, irregular, and opaque body, of the same consistence with the lens; and, immediately after, there followed another of the same nature. At first I judged them to be detached fragments of the lens itself; but in this I was mistaken; for that part was quite equal and entire on its surface.

The patient took a table-spoonfull of the oil of sweet almonds thrice, and had no other diet but gruel. At night I ordered her a pediluvium.

A few hours after the operation, she was seized with slight fits of heat and cold, for which she was blooded, and had one grain of opium given her.

On the fourth of July, she found herself quite well, but had a slight febrile attack towards

wards the evening, which was less violent, however, than that of the preceding night.

As often as I removed the bandage, as often did she complain that the light hurt her eye, even through the eye-lids.

She had had no stool since the operation, on which account I ordered her a pretty large dose of oil of sweet almonds, which had the desired effect.

On the fifth, she was quite free from all febrile symptoms; and as she now seemed so well in every respect, I ventured to open the eye cautiously the next day. The cornea was clear and transparent, the wound closed, but of a whitish colour; the anterior chamber filled with the aqueous humour, the pupil clear, and the conjunctiva not in the smallest degree inflamed. The eye itself was so extremely sensible to the impression of light, that even the small quantity of it which was allowed to enter the apartment, made her uneasy.

The patient, full of joy at the happy event of the operation, allowed every one that came to her, to open and examine the eye. The next night she experienced the most acute pain in it.

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On the seventh, I ordered her a purge, and on my opening the eye the following day, I found it a little inflamed; the pupil was oblong, oblique, and drawn downwards towards the wound; the inferior portion of the iris had dilated the wound, and hung a little out of it. The patient again felt acute pain in the eye the next night.

On the ninth, I observed a portion of the vitreous humour prolapsed; it resembled a small bag filled with water, and was quite pale. I cut the little bag open with a pair of scissors, on which a small quantity of a watery fluid flowed out, the tumor immediately collapsed, and, from that instant, all the pain ceased. But the wound remained irregular, and the pupil long, oblique, and depressed.

On opening the eye again, on the twentieth, the patient assured me she saw every object in an oblique position. By the first of August the wound in the cornea was become less irregular, the pupil less oblong, and oblique, and the objects appeared to the patient more in their natural position.

I now allowed the patient to return home, informing her at the same time, that all these faults in her eye would disappear in the course of
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of time. But I never had an opportunity of seeing her again.

C A S E IV.

A woman, aged fifty years, of a pale and unhealthy look, of a delicate constitution, and who had lately sustained much distress, had a cataract in both eyes. The one in the right eye was of ten, that in the left of six years standing. She had been couched in the left eye eight years before this, but the lens had again arisen to its former place. The pupil in the right eye moved with freedom, the cataract was of different shades, and the patient could distinguish light from darkness; nay, she could also perceive such objects which were placed at her side. I performed the operation of extraction on this eye, on the sixth of February, after having prepared the patient in the usual way.

I opened the cornea, punctured the capsule, and made a pressure on the eye, but without being able to move the cataract. Fearing that I had not sufficiently punctured the capsule, I again had recourse to La Faye's instrument, which I employed with every degree

gree of accuracy, and again made the usual pressure, but still the cataract did not move. I now began to suspect that there might be an adhesion between the cataract and capsule; in order to loosen which I introduced a round sharp pointed needle into the eye, and thrusting it into the body of the lens, I moved this upwards, sideways, and downwards, several times; after which I withdrew the needle. I then began the pressure again, and the cataract came out. It was hard, and very large. The patient was quite overcome with anxiety and trembling, and seemed ready to faint.

Soon after the operation she was seized with alternate fits of heat and cold; her spirits were much sunk, and she felt a pain in her eye. I ordered her to be blooded, and to have a pediluvium. On the seventh, she was better, and the pain in her eye was less. The patient used the pediluvium twice, and took some cooling salts; notwithstanding which, the pain increased next night, and she again had some attacks of heat and cold. On the eighth, the aqueous humour ceased to flow, and the pain in the eye was trifling. The patient complained of nausea, and a disagreeable

bitter taste in her mouth, for which she was ordered salts and manna.

She was very restless the following night, and had constant cold and hot fits. The pain in the eye was moderate during the whole of this day.

The patient complained of being cold and chilly the whole of the ninth day, and again had a bitter taste in her mouth; for which she took a purge. The pain in the eye was inconsiderable.

On the twelfth, I opened the eye-lids a very little for the first time, and discovered, to my great astonishment, that the eye was violently inflamed, the conjunctiva greatly swelled, and very red. I immediately ordered a strong purge, applied a large blister between the shoulders, and wetted the compresses that covered the eye with a solution of alum. Next day I caused her to be cupped and scarified on the neck, shoulder, and arm. Under the administration of these remedies, the pain in the eye, which, till now, had always been moderate, began to be very violent. The patient complained of a gnawing pain in the ball of her eye, attended with a painful sensation of

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of weight in the orbit, forehead, and over the whole head, which indeed was so violent as to deprive her of sleep.

I again opened the eye on the twentieth, and found it full of pus; on which I immediately opened the inferior part of the wound of the cornea, and a few drops of purulent matter discharged, after which the pain abated a little. I then moistened the eye with a discutient eye-water, and bound it down. The bandage was removed on the twenty-first. A little purulent matter was discovered on the compress. The wound towards evening seemed closed, but I again opened it with the point of the knife, and a little more pus discharged. The upper part of the anterior chamber seemed now free from any matter.

In this way I proceeded for three days, giving laxatives, applying discutients and blisters, and always keeping the wound open. The patient, however, never recovered the use of her sight; for the pupil remained obscure, and the whole ball of the eye was diminished in size. The gentleness of the pain had entirely deceived me, and I did not discover that the inflammation had run into suppuration until

it was too late to prevent the evil consequences.

quences.

CASE V.

A woman, aged thirty-five years, of a pale complexion, and timorous disposition, applied to me to have the operation for the cataract performed upon her. She had been always subject to frequent inflammations of her eyes, and, four weeks previous to this application, had lost a great quantity of blood in consequence of a miscarriage. In the right eye there was an incipient cataract, but she could still distinguish large objects with it. The cataract of the left was of 'a pearly colour, not, however, so opaque as to deprive her of being also able to distinguish large bodies, or very lively colours.

I prescribed a cooling diet for three days, employed the pediluvium, and made her swallow, now and then, a table spoonful of oil of sweet almonds.

The day preceding the operation, I ordered her a dose of cooling laxative salts, which not only purged her, but also caused her to puke, and bring up a great quantity of green stuff.

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I performed the operation on the left eye on the first of September. The cataract resembled a jelly, and came away in portions. I was forced to make use of Daviel's scoop several times in order to clear the pupil, but in spite of all my endeavours, there remained in the upper part of the capsule, a small white opaque piece, which I could not lay hold of, nor extract. For fear of irritating the eye too much, I desisted from further attempts, and allowed it to remain. The patient was much alarmed during the operation, and trembled from head to foot. She swallowed two spoonfuls of oil of sweet almonds, and then went to bed.

An hour after the operation, her pulse became weak and irregular, her spirits were uncommonly sunk, she felt an universal lassitude, and had frequent shiverings, accompanied with sickness at stomach, and cholic pains. She puked three times, experienced the most acute pain in her eye all night, and had no sleep. She was blooded, but very little could be obtained.

All these symptoms were much diminished the next morning, the second of September.

The patient was pretty cheerful, the eye pained her but little, the eye-lids were neither red nor swelled; and, on removing the bandage, she could feel the light through them.

As she had had no stool since the operation, and complained of a disagreeable bitter taste in her mouth, I ordered her a glyster, and a weak solution of laxative salts, which produced two stools, and she passed the day without being restless or pained. Towards evening, however, all the symptoms of the former night returned: the patient became restless, hot, and felt a pain in her eye. I ordered a blister to be applied behind each ear, and on her temples. On the third, the pain in the eye was little, the aqueous humour still flowed out, and the patient went twice to stool. At night the pain again became violent. In the morning I applied a large blister between her shoulders, upon which she had a very good night, and was pretty free from the pain in her eye.

On the fifth of September, she was entirely free from all pain, had two stools, and was otherwise in good health. The eye-lids were red and tumid, which prevented her from
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feeling the light in her eyes when the bandage was removed. The aqueous humour still flowed out.

The pain in the eye returned again on the sixth, and the patient complained, at the same time, of a bitter disagreeable taste in her mouth. Her tongue was foul. These symptoms soon yielded to the use of the vitriolic acid.

On the tenth, I attempted, for the first time, to open the eye-lids, but shut them again immediately on my observing the eye to be much inflamed. In spite of every precaution in performing this, it still occasioned much pain to the patient for some hours afterwards. I caused another blister to be applied between the shoulders,

On the twelfth, I again opened the eye. The cornea was so dim and obscure that I could hardly discern the pupil, and the patient herself could only distinguish light from shade. The inferior portion of the iris was prolapsed, and projected through the wound of the cornea. I continued to prescribe laxatives, to apply blisters, and make use of a solution of alum, and again opened the eye, for the third time, on the twenty-second of September. The inflammation

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inflammation was much diminished, and the prolapsed portion of the iris was so completely returned, that the wound was quite closed. Now that the muddiness of the cornea had considerably disappeared, I could observe that the pupil was oblong, depressed, and clouded.

I ordered the patient bark, as she seemed much debilitated.

By the twentieth of October, there was no appearance either of inflammation or of wound to be seen. The cornea and aqueous humour were clear and transparent, and I could now distinctly perceive the iris and pupil, for the first time. The pupil was oblong and quite clear, except towards its left side, where one could discern a long opaque stripe. The power of vision was weak.

I saw this patient again on the twelfth of November, and found her sight much stronger.

C A S E VI.

A woman, aged fifty-seven years, subject to the gout, and whose feet were frequently swelled, was blind from the cataract. That
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in the right eye was of six years standing, and seemed in every respect fit and proper for the operation. The lens of the left eye had already begun to grow opake, the pupil was muddy, and, to the patient, every object appeared as if seen through smoke and clouds. In spite of the bad habit of body of the patient, I allowed myself to be prevailed upon, at her earnest request, to perform the operation, flattering myself that, with pains and care, I should, perhaps, be able to ensure a successful issue. I caused the patient to observe a strict diet for some days, ordered her a purge at two different times, and afterwards performed the operation, on the twenty-ninth of September, on the right eye.

The operation itself succeeded well and quickly. The lens was hard, and came out entire; still, however, I found, upon narrowly examining the pupil, a remains of opacity at its upper margin, which I could neither lay hold of with Daviel's scoop, nor extract in any other way. I accordingly desisted from all further endeavours, and bound the eye down.

Soon after the operation the patient complained that her eye rolled involuntarily up

and down under the bandage. She swallowed a couple of spoonfuls of oil of sweet almonds, and, towards evening, put her feet in warm water. The pain in the eye was pretty acute during the night, and she had no sleep. Next morning, however, it had ceased.

On the thirtieth of September, I ordered her a dose of laxative salts, and a pediluvium at night, which night she passed pretty quietly, and free from pain. She continued well also the whole of next day, but experienced a most acute pain in her eye during that night. On the second of October, towards morning, the pain abated. I caused her to be bled at the ankle, and ordered her to take some vitriolic acid, as she complained of a bitter disagreeable taste in her mouth.

The third of October, the pain continued still as violent as on the preceding day, and the bitter taste in her mouth. The patient took a dose of tincture of rhubarb and nitre, and employed the pediluvium at three different times. The compress was frequently wetted with a solution of white vitriol. Next night the pain was less.

On the fifth of October, I gently opened the eye, for the first time, and perceived it to be

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violently

violently inflamed. A large blister was ordered to be applied immediately between the shoulders, and the tincture of rhubarb to be repeated. In spite of these measures the pain in the eye returned again at night. On the seventh, she was entirely free from the bitter taste in her mouth, but the redness of the eye was not diminished. The pupil was clear, open, very large, and the eye itself much affected by the light. From the inferior part of the wound there hung out a small portion of the vitreous humour. It was whitish, attached by a very slender filament, and easily separated. The ninth of October, the patient felt an acute pain, not only in the eye itself, but also over the forehead. Two blisters were applied to the temples, and one to the nape of the neck; and as she had constantly more or less of a bitter taste in her mouth, I ordered her gentle laxatives.

On the 20th of October, I again opened the eye-lids. The redness was much diminished, the cornea was obscure, and the aqueous humour so muddy, that it was with difficulty I could distinguish the pupil.

By the first of November, the redness of the eye had totally disappeared. I now ordered

dered the patient, who was much debilitated, the bark, and allowed her to open her eye now and then in a room that was darkened.

I visited her on the seventh of November, She could only distinguish light from shade. The pupil was very small. The upper half of the cornea was clear and transparent, the inferior one was quite white, having several red spots here and there. The cicatrix of the wound was thick and irregular. The pain and inflammation entirely gone. By the twenty-seventh, there was not any mark of the wound to be observed. A little shooting pain was felt now and then, but soon ceased. The pupil had almost entirely closed itself, and, it was observed, that the sight of the other eye evidently grew worse during the whole of the cure.

C A S E VII.

A strong and healthy man, aged fifty-two years, who, during his whole life, had been subject to congestions of blood in his head, and was frequently troubled with head-achs, applied to me, on the first of June, in order to have

have the operation for the cataract performed. He had a reddish copper-coloured countenance, and was blind in both eyes.

He had been couched in the right eye twenty years before, by an itinerant oculist, which terminated very unsuccessfully; for the pupil was entirely closed, and the whole ball of the eye much diminished in size. It was therefore impossible to remedy the blindness of that eye.

The pupil of the left was oblong and immoveable. The patient could not distinguish light from shade; but he assured me that this had happened only a few days before. Almost immediately behind the pupil lay a milky cataract, across the middle of which run a white shining stripe, but which seemed to be seated anterior of the lens and in the capsule. From all these circumstances I was led to conjecture that the cataract adhered to the iris, and therefore I refused to perform the operation.

The patient returned home, but soon after wrote to me, that during a thunder storm he had plainly seen the flashes of lightning, and earnestly intreated me to attempt the operation. I accordingly allowed myself to be prevailed

prevailed upon, in spite of all the difficulties which threatened me; but previously warned the patient, that I could not answer for the success of the operation, which was performed on the twenty-second of July. As soon as the incision of the cornea was finished, and before I had time to puncture the capsule, the lens sprang suddenly forward, and out of the eye, the pupil remained perfectly clear, but the patient could not see. I was therefore deceived in my conjectures, and had taken that for a sign of the adhesion of the iris, which in fact was only a consequence of the amaurosis. It is a very singular circumstance, that in this case the iris, which, previous to the operation was quite immovable, moved quickly and freely after it. The white stripe which appeared anterior of the lens before the operation was still seen behind the pupil; but as the patient was blind, I did not think it worth while to extract the capsule in which it seemed to be seated.

During a few days after the operation, the patient was so well and free from pain, that I allowed him animal food to his meals. On the seventh, however, he was suddenly
seized

seized with a most acute and violent ophthalmia, which yielded to the usual remedies.

I opened the eye on the fifteenth day from the operation. The pupil was oblong, but moveable. The whitish stripe seemed to be a little broader, but the patient was quite blind.

C A S E VIII.

A woman, aged fifty years, of a good constitution, had a cataract in both eyes. But to use the vulgar expression, they were still unripe. The patient could not only distinguish light from shade, but also some of the brighter colours, and even large objects when near. The colour in the pupil resembled that of a thick cloud. She was blooded, put upon a spare diet, and thrice purged. I performed the operation on the fourteenth of June. After having finished the incision of the cornea, I gently pressed upon the eye, and the lens came easily forward. Scarcely however had that taken place when the patient fainted away.

When she recovered, I began the operation
tion

tion on the other eye, and having cut the cornea, and punctured the capsule, I pressed the eye pretty strongly, but the lens did not move. Having increased the pressure considerably, the lens suddenly started forward, together with a portion of the vitreous humour, upon which I instantly shut the eye, and having opened it again a few minutes after, could not discover any of the prolapsed vitreous humour.

The patient remained perfectly free from pain, and every other bad symptom, until the sixth day, when the right eye became a little painful. This pain, however, did not create so much uneasiness to her as a constant sensation of weight and pressure in the region of the eye-brows. Towards evening she was hot and restless. These symptoms disappeared at one time and returned at another. The patient remained in this state during four weeks, at the end of which I ordered her the bark, when the symptoms gradually diminished, and at last totally disappeared. The oppressive pain above the eyebrows continued the longest, and for some time returned upon the patient's laying aside the use of the bark.

I examined

I examined the state of her eyes on the twelfth of July, and found the pupils of both to be quite round and clear, the iris contracted and dilated easily, and the cicatrix of the wound was scarcely discernible. The patient saw quite distinctly, except in the right eye, before which she thought some black spots were always floating.

On the first of August, she informed me that the slight inconveniencies she had experienced had now entirely left her, and that she could distinguish the most minute objects with the assistance of her glasses.

C A S E IX.

A man, aged twenty-five years, had a cataract in both eyes. His general health was otherwise good; the iris of both eyes was moveable, and the cataract itself of a milky colour. He could not only distinguish light from shade, but also colours and large bodies.

After having prepared him in the usual way, I performed the operation on a very hot day, the ninth of July. I had scarcely punctured the capsule, when a substance like jelly

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flowed

flowed out. In the same moment the pupil became clear, and the patient saw distinctly. The same thing happened with the other eye.

Soon after the operation, I caused the patient to swallow two table spoonfuls of fresh oil of sweet almonds, and some drops of laudanum. Towards evening he bathed his feet in warm water. He was seized with a shivering fit in the night; but found himself quite well next morning, and was free from pain. As his tongue appeared foul, I ordered him an ounce of cream of tartar, and to be allowed no other diet than gruel for the whole day. In the evening his tongue appeared cleaner. He had frequent chilly fits, and a sensation of contraction and tension in his extremities, but these disappeared on taking some drops of liquid laudanum. The left eye was a little painful, but the right one gave him no kind of uneasiness.

On the twenty-first, he had no pain nor fever, the eye-lids were neither red nor swelled: but as he retained a bitter taste in his mouth, had a foul tongue, and disagreeable eructations, I again ordered him the cream of tartar. Towards evening he was seized with chilliness and tremor in the extremities.

The twenty-second of July, his eyes itched a little; in the evening, his pulse became full and quick, and the patient himself was hot. He took some spirits of vitriol. He was restless during the night, and perspired profusely; but this might have proceeded from the hot weather which then prevailed.

July the twenty-third. All pain in the eye was entirely gone, and in other respects he was in perfect good health. The flow of tears had ceased; his pulse was soft and slow; his tongue, however, was a little foul, and he retained a bitter taste in his mouth. He continued to take the acid of vitriol, and observed so strict a diet, that he eat no other kind of food but gruel.

July the twenty-fourth. He found himself perfectly well, but still had a disagreeable bitter taste in his mouth, for which I ordered an emetic. Having taken it the next day, he brought up a great quantity of green bitter acrid stuff, which entirely relieved him from all his remaining complaints.

July the twenty-seventh. I opened the eyes. Both were so perfectly free from inflammation, and every other kind of blemish, as to render it almost impossible for any one to have discovered that an operation had been

performed on them only a few days before. The cornea was transparent, the pupil clear, round, and moveable.

On the thirty-first, he returned home. Two years afterwards, I learnt that this man continued to see quite well, and followed his trade, which was that of a house-carpenter.

C A S E X.

A foldier, who had been discharged the service, aged sixty-one years, of a good constitution, had lost his left eye from a wound, and was affected with a cataract in the right. It was of a perfect pearl colour, the pupil was round, the iris contractile, the cataract seemingly at a good distance from the pupil, and the patient was able to distinguish light from shade.

After having prepared him for some days for the operation, I performed it on the twentieth of May.

I scarcely had finished the incision in the cornea, when the lens suddenly started out. It was enveloped in its capsule, which seemed to adhere to it at different points; in other
places,

places, however, it was loose and plaited. On its anterior surface one could observe from sixteen to twenty black stripes verging towards a common center, and resembling a star. They were pulpy, and easily washed off.

As the pupil was quite clear, I immediately applied a bandage to the eye, and lest the separation of the capsule might be followed by bad consequences, I caused the patient to be bled.

He passed a very good night, and next day had neither pain nor fever. He eat nothing except gruel and bread and butter, and took three drachms of laxative salts every three hours.

May the twenty-second. He felt a slight pain in his eye, but had slept very well the preceding night, and had two stools. When I visited him he was eating some hung sausage, and as he found himself well, refused to take any medicines. His pulse was quiet and soft. He had a very good night, but felt a little pain next day. He took no medicines. The compress was often wetted with Goulard's solution. In one word, although the patient did not observe the most strict diet, yet no bad consequences happened.

pened. The pain in the eye disappeared in the course of a few days ; and on the twenty-seventh I opened his eye. The pupil was clear and round, the iris moveable, the patient saw distinctly, and the cicatrix resembled a whitish stripe. He returned home on the thirtieth.

F I N I S.

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